SOUTHERN POWER AND INDUSTRY

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SEPTEMBER, 1952

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SOUTHERN POWER & INDUSTRY is published monthly at 5031 A. Chestnut St., Philadelphia 39, Pa., by W. R. C. Smith Publishing Co. Executive and Editorial Offices: 806 Peachtree St., N.E., Atlanta 5, Ga. Entered as second-class matter at the Post Office, Philadelphia, Pa. Subscription Rates: United States and Possessions, $1.00 per year or three years for $2.00; Foreign Countries, $10.00 per year.

Volume 70 Number 9

99.997% (OR BETTER!) Pure Steam

WITH Nalco ANTIFOAM TREATMENT

NALCO Antifoam Chemicals, used as a part of Nalco System Water Treatment, consistently produce steam with only 1 to 3 parts per million solids content — and frequently permit more than double the dissolved solids in the boiler water without danger of carryover!

Truly dry steam is a welcome and valuable protection for turbines, pumps, and the entire steam system ...and Nalco Antifoam Treatment makes a simpler problem of control of boiler water dissolved solids, since it prevents carryover at concentrations far exceeding average practices.

Your Nalco Representative can show you copies of actual steam quality charts that are typical of the *before* and *after* performance of Nalco Antifoam Treatments — *but the best proof is in your own boilers* ... Call or write, today.

1. PURE DISTILLED WATER has no dissolved solids; produces big steam bubbles that burst instantly at surface as shown in Nalco Laboratories test tube boiler.

2. BOILER WATER has high dissolved solids; small bubbles with foaming tendencies cause carryover and impure steam.

3. BOILER WATER WITH NALCO ANTIFOAM Treatment — same water as in Photo No. 2 — now produce large bubbles without foam and pure steam ...the same results as distilled water.

Photos in Nalco Laboratories — unretouched.

... and PRECISION-CONTROLLED BLOWDOWN

● Precision control of boiler blowdown is assured with the Nalco Meterblo Valve...Large, easy-to-read settings ... quick-opening and closing...can be mounted in 16 different positions without special fittings. Now available through your Nalco Representative . . . or write direct.

NATIONAL ALUMINATE CORPORATION
6226 West 66th Place • Chicago 38, Illinois

Canadian inquiries should be addressed to Alchem Limited Burlington, Ontario, Canada

THE Nalco SYSTEM • Serving Industry through Practical Applied Science

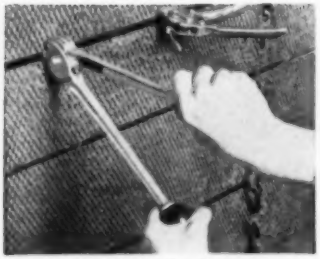
Save

TIME...POWER...MONEY

with EAGLE-PICHER Insulations

SUPERTEMP BLOCKS

These are efficient insulating blocks manufactured from Eagle-Picher High Temperature Mineral Wool. They derive low thermal conductivity, high refractory value, and outstanding chemical and physical stability from this basic insulating material. Weight is approx. 22 to 24 lbs. per cu. ft. Designed for temperatures up to 1700 F.

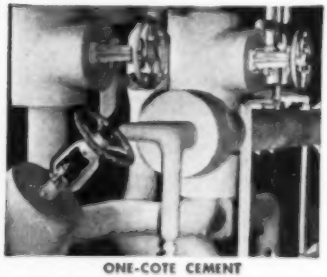


MINERAL WOOL BLANKETS

The answer to the problem of quickly and efficiently insulating flat or curved surfaces on larger types of heated equipment. Factory-made, these blankets are *certified* to meet rigid high standard specifications, offer unexcelled uniformity of mineral wool distribution. Withstand continuous exposure to temperatures as high as 1200 F. . . . offer maximum water repellence . . . resistance to steam, corrosive fumes, normal vibration.

SUPER "66" INSULATING CEMENT

A rust-inhibitive, super-adhesive insulating cement . . . offers exceptional coverage, extreme thermal efficiency. "Springy ball" structure—with small resilient pellets, each containing thousands of "dead" air cells—provides one of the most effective heat barriers known. Easily trowelled over all kinds of surfaces. Efficient up to 1800 F. . . . reclaimable where temperatures don't exceed 1200 F. Can be applied to any heated equipment.



ONE-COTE CEMENT

One-Cote provides both insulation and a smooth off-white finish coat. Unexcelled for coverage —100 lbs. covers approx. 40 sq. ft. one inch thick—Eagle-Picher One-Cote Cement is of uniformly high quality . . . quick setting, easy to handle . . . can be painted. This self-protected insulation withstands temperatures up to 1000 F.

MAXIMUM FUEL SAVINGS AND EXACT TEMPERATURE CONTROL WITH THESE EAGLE-PICHER INSULATIONS:

• Insulating Felts • Supertemp Block • Blankets • Loose Wool • Pipe Covering
• Stalastic • Stamastic • Insulseal • Finishing Cements • Insulating Cements
• Fireproofing Cement • Swetchek • Diatomaceous Earth Block.

EAGLE EP PICHER

THE EAGLE-PICHER COMPANY *Since 1843*

GENERAL OFFICES: CINCINNATI (1), OHIO

Insulation products of efficient mineral wool—for a full range of high and low temperatures. Technical data on request.

SOUTHERN POWER AND INDUSTRY

SEPTEMBER 1952

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CONTENTS

HELPING THE MAN-IN-THE-PLANT

DEPARTMENTS

Contents indexed regularly by Engineering Index, Inc.

Editorial and Executive Offices: **SOUTHERN POWER & INDUSTRY, 806 PEACHTREE ST., N. E. ATLANTA 5, GEORGIA**

Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

September, 1952

► THESE BRIEFS TELL THE STORY — U. S. Sugar in Florida used to place sugar bags inside freight cars with a conveyor and stack by hand. Now special "catch-bin" unit on spring mounted members permits fork trucks to handle bags without use of skids or pallets — 75 per cent saving.

Wide load swings handled easily, CO_2 up from 6 to 12 per cent, fuel bills reduced, and boiler efficiency 82 per cent from modernization in St. Louis plant of Falstaff. New boilers plus forced draft control unit did the job.

150 hp boiler of Royal Mfg. Co. in Georgia was hand-fired with shavings, sawdust, etc. Plant employed three firemen 129 hrs on straight time and 48 hrs at time and half weekly. Steam pressure erratic. New wood shavings burner eliminated 3 full time firemen and resulted in burning 1/3 less fuel for same steam load.

The above briefs of 3 of the 88 Case Studies in our October 51 issue emphasize that Southern industry has great opportunity for BETTER PRODUCTION — tools, equipment, and methods improvement in all plant services and production departments. So watch for the big 5th Annual BETTER PRODUCTION Issue of SP&I, in the mail by October 1st, presenting a top selection of case studies from the South and Southwest, showing how specific plants are increasing output per worker through new plant tested techniques.

► CHECK ON THE PLASTIC DOTS, that offer a lot more abrasive wear from canton flannel work gloves. Riegel Textile Corporation permanently sets plastic dots into standard 10 ounce flannel and the resulting work glove is claimed to outwear canton flannel 2 to 1 and cut glove expense 40 per cent. The product retains the lightness, flexibility and comfort found in regular canton flannel gloves.

► USE OF RUBBER HOSE IN CONVEYING ACIDS has been limited to these maximum concentrations: sulfuric 50%, nitric 10%, acetic 10%, hydrochloric 80% and hydrofluoric 50%. Hewitt-Robins Incorporated believes that their newly developed compound will raise these percentages to 100% concentrations except on nitric and sulfuric, which can be recommended for 75% nitric and 98% for sulfuric.

► WITH AN EYE TO PERMANENCE — The timber growing industry has reached a sustained yield basis through modern forestry and timber farming methods. It is only natural that progressive lumber manufacturers, seeing a more stable source of supply and a more stable economic condition in their industry, should look to the future and plan the modernization of old mills and the construction of new mills on a permanent basis.

Typical is the extensive modernization program at the Southern Pine Lumber Company of Diboll, Texas. First phase of the program — new cutting automatic end trimmer, edge sorter and unstacker, modern kilns, belt and chain conveyors — featured in the November 51 issue of SP&I.

The company's modern rough lumber storage building, which cuts materials handling manpower requirements and protects product in process, is described in this issue. Southern Pine is now one of the most up-to-date and streamlined operations to be found in the industry.

(Continued on page 6)

facts and trends (continued from page 4)

► WHEN YOU WANT A SMOKE, whether in an office, factory, or up a utility pole, you want a lighter that stays where it's supposed to be. Check on Zippo's new "Tach-A-Loop" lighter, a wind-proof lighter with a handy loop attachment fastened to the hinge of the cover. It can be fastened to a watch chain or a leather or cord strap.

► NEW DUAL-PURPOSE PRESERVATIVE OIL has been developed by the Port Neches, Texas, Laboratories of The Texas Company. It functions both as a lubricant and as a preservative, eliminating the need for handling two products successively.

When an internal combustion engine is taken out of service for storage or shipment it must be protected against rust and acidic products while it is not being used. It must also be properly lubricated for service preceding or following the stand-by period. In the past the lubricant was drained from the engine and a preservative put in, and vice versa, depending upon whether the engine was going in or out of service.

The new lubricant-preservative has also proved useful in other internal combustion engines in intermittent service. When functioning as a lubricant, the oil need not be changed until the engine has reached normal drain-and-refill point. It is compatible with qualified heavy-duty motor oils.

► COMPLETELY ODORLESS PAINTS in every interior finish and full selection of colors have been developed by the Keystone Paint and Varnish Corporation. Offices can be painted with the odorless interior oil-base paints while people are in the same room. If this is impractical, offices can be used immediately after painting or within the few hours necessary for the surface to dry, without any trace of paint odor.

► COLD GALVANIZING for the surface protection of steel and iron has been announced by the Galvanite Corporation. Compound may be applied with an ordinary paint brush, electric spray gun or by cold dip. Manufacturer emphasizes that "Galvanite" is not a paint — it combines with the base metal, setting up electrical continuity and leaving a coating of 96 parts, by weight, of chemically pure zinc.

► AN ALUMINUM-ASBESTOS ROOF COATING is reputed to lower interior building temperatures 15 to 20°F and permanently prevent roof deterioration. The Monroe Company product - Asbestolite - is made of aluminum flakes and asphalt and asbestos suspended in a waterproofing oil vehicle. It is highly fire retardent and can be applied to any type of roof.

► TROUBLESOME SUPERHEATER DEPOSITS? Ash deposits from fuel oil are now being modified to make them more readily removable. Satisfactory results in relieving the problem of the deposits on boiler tubes from the firing of residual fuel oil have been accomplished in both laboratory and field operations by The Babcock & Wilcox Company. Test programs have been conducted at the Inglis and Higgins stations of the Florida Power Corporation and at a Tampa Electric Company station.

Additives in the form of finely divided materials suspended in the fuel oil and organic compounds of the soap type were tried in pilot-plant tests in various weight ratios to the ash in the oil. Alumina, magnesium oxide, and calcium oxide were found to be the most promising. Alumina and dolomite were tried in field work. These tests indicated a real saving in the amount of labor required to keep a unit operably clean and operating efficiently with present day oil fuel. In addition, the corrosive quality of the gases from the stack is greatly reduced and the nuisance from flyash particles is not as great.

Write the editors for additional information on any of the above items.
SOUTHERN POWER & INDUSTRY, 806 Peachtree St., N.E. Atlanta 5, Ga.

NEW EQUIPMENT for Southern Industry

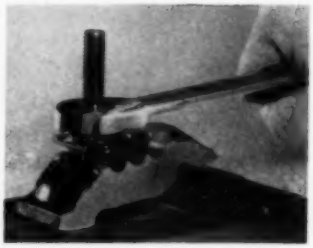
Free additional information is available to readers of SP&I. Circle the item code number on one of the reader service post cards provided on pages 17-18.

Self-Setting Clamps

K-1 ALPHA TOOL & SUPPLY COMPANY, Box 119, Westwood, N. J., is distributor for new Autoset self-setting clamps for presses and machine tools.

These clamps are constructed on a scientific design based on the use of three interrelated curved contact surfaces. The new design allows each clamp a gripping capacity for a wide range to accommodate various thicknesses of bolsters.

The elimination of packing at one end—which is the normal requirement in the old type of clamps—plus the solid gripping, ensures against the danger of any tool slipping from the position in which it is held. As a result of this solid gripping capacity, an Autoset clamp with a ⅝ in. diameter bolt will hold as safely as a ¾ in. diameter bolt on the old type of clamps. These new clamps have been evolved to meet the requirements of any normal clamping on power and hand presses, lathes, drills, milling machines, shapers, planers, grinders, etc.



Autoset clamp has a number of transverse slots in top face. Washer can be moved to accommodate fixed bolt holes so that small bolsters may be secured as readily as the larger ones.

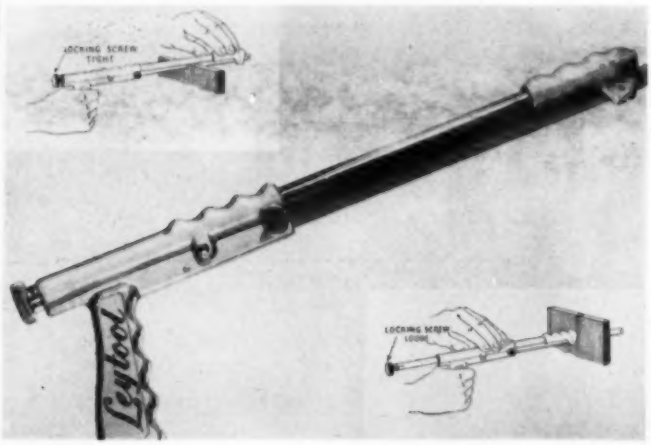
Hacksaw Design Permits Sawing of Unlimited Length

K-2 ALPHA TOOL & SUPPLY CO., Box 119, Westwood, New Jersey, announce the "Leytool," an endless hacksaw designed so that the operator can saw through an unlimited amount of material without being restricted by the usual hacksaw frame.

Tool consists of a spring loaded plunger with a pistol grip handle, and a guide tube which supports the regular 10 or 12 in. hacksaw blade. Blade rides on three hardened steel balls in the front casing of the guide tube.

After sawing to a depth equal to the width of the blade, a knurled locking screw is loosened. The front casing of the guide tube then remains at the point of contact of the blade and the work. Blade is now actuated by the spring loaded plunger, and is not restricted to the depth of cut. Pressure is needed on the forward stroke only as the powerful internal spring makes the return stroke automatic and thus reduces fatigue.

Blade of the "Leytool" endless hacksaw can be inserted through a ½ in. hole for sawing out parts of boards, wall panels, etc.



New Dual-Purpose Oil

K-3 THE TEXAS COMPANY, 135 East 42nd St., New York, N. Y., announce the development by their Port Neches, Texas, laboratories of a new dual-purpose preservative oil called Texaco Preservative 10, and 30.

The internal combustion engine which is temporarily taken out of service for either storage or shipment presents a special problem. It must be properly lubricated for service preceding or following the stand-by period, and it must be protected against rust and the acidic products of combustion while it is not being used. In the past it has been necessary to accommodate these separate needs with separate products. The lubricant was drained from the engine and a preservative put in, and vice versa, depending upon whether the engine was going in or out of service.

Texaco Preservative Oil 10, and 30 functions both as a lubricant and as a preservative, eliminating the need for handling two products successively. When functioning as a lubricant the oil need not be changed until the engine has reached the normal drain-and-refill point. It is compatible with qualified heavy-duty motor oils.

(Continued on page 10)

new equipment (continued)

For more data circle item code number on the postage free post card—p. 17

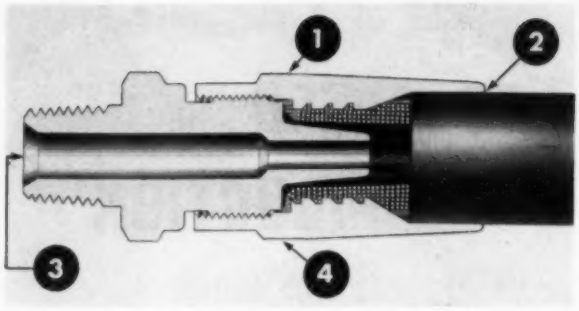
Reusable Couplings

K-4 LINCOLN ENGINEERING COMPANY, 5702-24 Natural Bridge Avenue, St. Louis 20, Missouri, announce the new Lok-Tite reusable couplings, which can be used over and over again wherever there are flexible hose lines.

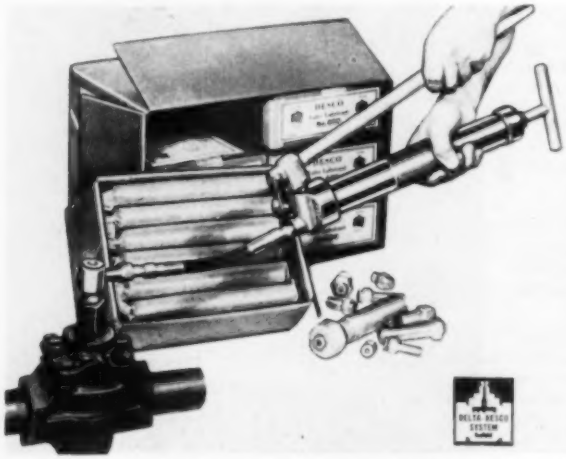
When core of the hose is inserted in sleeve, wire braid is flared and gripped between shoulder of stud and shelf of sleeve with tremendous clamping force. This eliminates dependence on pressure from wedging the core in the sleeve to hold coupling to hose —a disadvantage inherent in the design of other reusable couplings.

Bell-shaped counter bore of sleeve eliminates difficulty in starting hose into coupling. Wire braid on hose tends to expand or flare. Bell-shaped bore engages flared ends acting as a screw, simplifying assembly.

Extra large flow-passage in stud, plus shorter overall length of stud reduces restriction to a minimum. End of the core is completely confined by metal—assures safer handling, positive leak-proof performance.



Four design features of *Lincoln Engineering Company's* reusable couplings are: 1. Lok-Tite positive grip; 2. Faster, easier assembly; 3. Larger volume flow; and 4. Elimination of hose extrusion.



Delta Engineering Sales Company's Delta-Desco System of plug valve lubrication. Gun is loaded with convenient size sticks and develops 10,000 lb pressure.

Plug Valve Lubrication

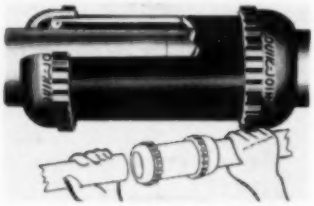
K-5 DELTA ENGINEERING SALES COMPANY, 806 Louisiana Avenue, Shreveport, Louisiana, announce the Delta-Desco plug valve lubricating system. Manufacturer claims that one operator can lubricate 10 to 15 plug valves in the time usually required to lubricate one with the conventional jackscrew method.

The Delta automatic plug valve lubricator is a simple, fool-proof device that attaches to the top of a lubricated plug valve. It automatically delivers a mensured amount of lubricant into the valve each time it is opened and closed. System incorporates a high pressure gun, fittings for adapting valves to gun, automatic plug valve lubricator and specialized lubricants.

Manufacturer states that all the plug valves in any plant can be lubricated with only three Desco standard service lubricants and one Desco special lubricant. Investment in lubricants is reduced and the hazard of incorrect lubrication is reduced.

Coupling Joins Pipe Without Threading

K-6 QUIK-JOINT MANUFACTURING CO., 469 E. 159th St., Harvey, Ill., has announced a factory assembled pipe coupling which can be installed in any piping system in less than 60 seconds.



Two easy steps on Quik-Joint installations—slip fittings (as received from factory) over unthreaded ends of pipe to be joined and then tighten the end nuts with an ordinary pipe wrench.

No thread cutting whatever is required. Pipes to be connected are simply inserted into the ends of coupling body and the lock nuts wrenched to desired tightness.

The result is a tightly sealed but flexible joint capable of withstanding working pressures up to 2000 psi. No castings are used; the body is of pressure-tested pipe steel having a greater wall thickness than the pipe to be joined. Lock nuts and gasket retainers are drawn from cold rolled steel.

(*Continued on page* 109)

a new draft gage!

easy to remove separate units

easy to read– no glare, no parallax

Available in four mountings

Semi-flush mounting

Eye-level mounting

Recessed mounting

Projected mounting

easy zero check from the front

exclusive magnetic access door–no screws, latches, handles

the HAYS *Vertiscale*

You designed this draft gage! You asked for these features!
Accessibility from the front makes possible easy "one man" method of quickly checking zero. (The fast 3-way cock with test fitting is *standard* on the Hays Vertiscale).
Simple maintenance—individual units can be quickly removed for inspection or adjustment. Removal does not affect other units in the case, does not disturb calibration of unit being re-installed.
No parallax—design eliminates reflections regardless of viewing angle.
No glare—internal fluorescent lighting is standard.
You get all these values *plus* functional styling in the Hays Vertiscale draft gage!
Write today for full information on the Hays Vertiscale Bulletin 52-1060-210.

Automatic Combustion Control
Boiler Panels • Hays-Penn Flowmeters
Veriflow Meters and Ventrol
Gas Analyzers • Draft Gages
Combustion Test Sets • CO_2 Recorders
Electronic Oxygen Recorders

THE hays CORPORATION

MICHIGAN CITY 4, INDIANA

Boiler-Burner Team Wins Seven Straight

Phillips Chemical Company orders Vogt boiler and Coppus-Dennis FANMIX burner combinations to make 1¾ million pounds of steam an hour

When a customer praises a product, that's fine. But when a customer *continually re-orders*, that's conclusive proof of user-satisfaction.

Phillips Chemical Company, Borger, Texas — producer of synthetic rubber — first installed Henry Vogt boilers with FANMIX burners back in 1943. As plant production increased, Phillips again purchased the same equipment — in 1946, and again in 1951.

Today, a total of 7 Vogt boilers equipped with Coppus-Dennis FANMIX burners provide 1,750,000 lbs. steam each hour for the production of synthetic rubber. The boilers are designed for 250,000 lbs. steam peak operation but have been operated as high as 275,000 lbs. per hour. Their performance is typical of the efficiency of boilers equipped with Coppus-Dennis FANMIX burners.

FANMIX • Better Combustion • Better Efficiency • Higher Ratings

All Coppus-Dennis FANMIX burners — for gas as well as combination gas-oil — have the exclusive FANMIX action. Their *revolving orifices* give violent mechanical mixing and agitation of gas and air, therefore causing instantaneous and complete combustion with *minimum excess air* (5% excess air is not unusual).

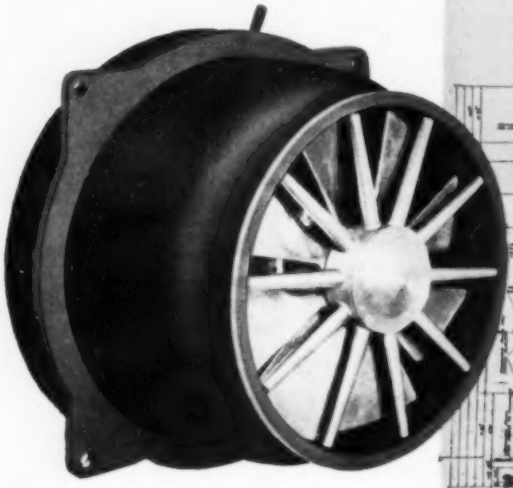
Because of this exclusive FANMIX action, furnace space is not required for mixing and *higher boiler ratings* are thus easily obtained. The burners also have a shorter flame than any other burner and will not cause flame impingement.

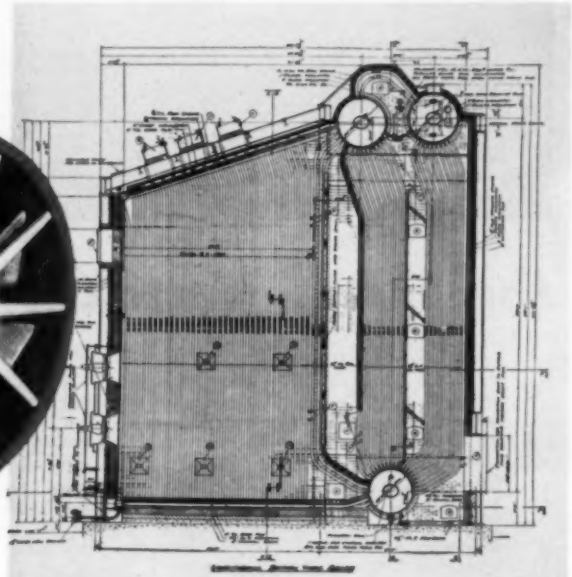
What's more, by incorporating a *fan* as an integral unit, FANMIX burners have *no draft loss* across the burner. As a result, increased ratings are possible regardless of draft conditions.

FANMIX action, with its quick completion of combustion, gives *lower* exit temperatures.

If you are not using Coppus-Dennis FANMIX burners in your present boiler, why not plan now to take advantage of the exclusive FANMIX action? You need no forced draft equipment, increase in stack or increase in furnace volume for FANMIX operation. And you get increased capacity. When specifying FANMIX on *new* boilers, you can plan on reduced combustion space, higher ratings, less stack height or reduced induced draft capacity — and, of course, *no* forced draft equipment.

For further information, mail coupon today. Sales offices in *Thomas' Register*. Other "Blue Ribbon" Products in *Chemical Engineering Catalog, Refinery Catalog, Best's Safety Directory* and *Mining Catalogs*.





JET REACTION is utilized to rotate fan which is integral part of burner. Ideal mixture for fast, complete combustion and peak efficiency is caused by automatically proportioned high velocity air passing at right angles through fuel.

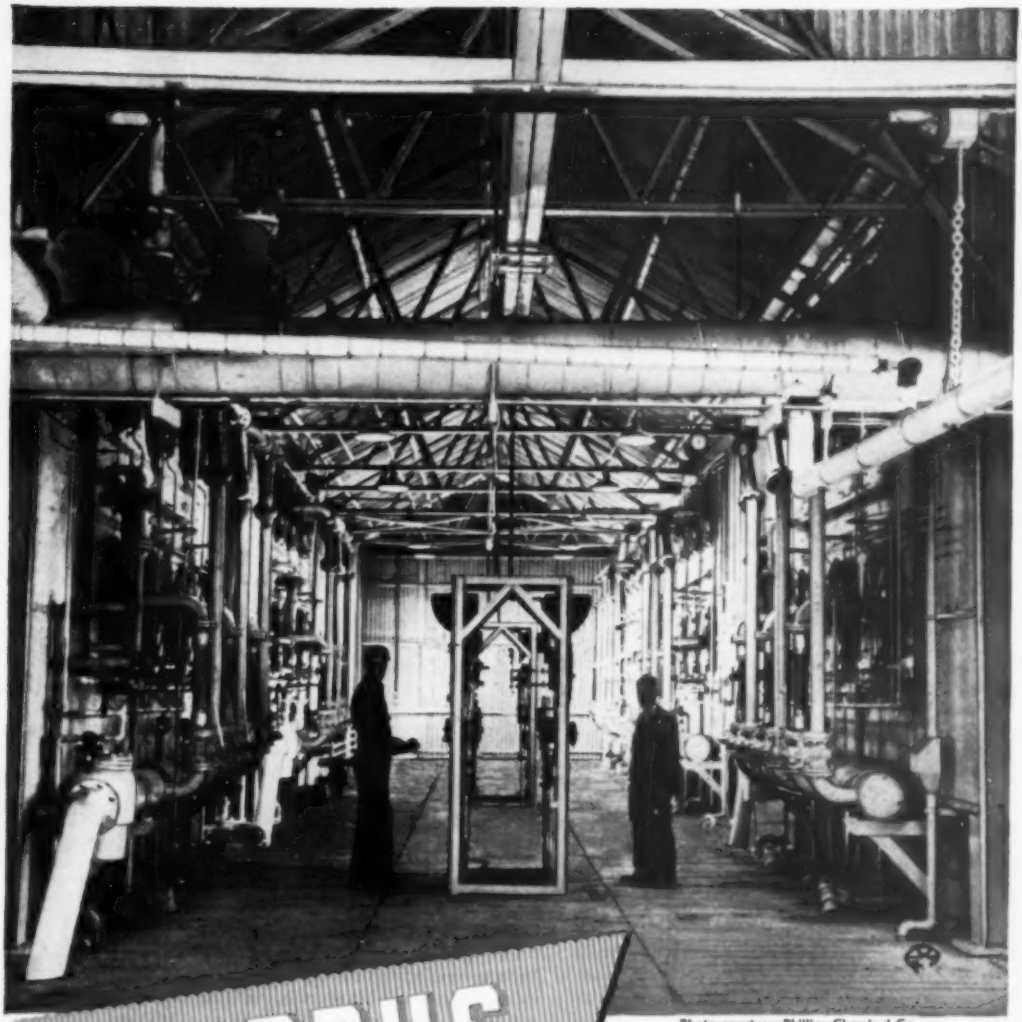


Photo courtesy Phillips Chemical Co.

HENRY VOGT BOILERS are here shown installed in the Phillips Chemical Company, Borger, Texas. Boilers use Coppus-Dennis FANMIX burners.

COPPUS

FANMIX® BURNER

GAS ... COMBINATION GAS-OIL

SEND COUPON for further information. Coppus engineers FANMIX burners to your individual requirements.

PLEASE ATTACH THIS COUPON TO YOUR COMPANY LETTERHEAD

COPPUS ENGINEERING CORPORATION
249 Park Avenue
Worcester 2, Massachusetts

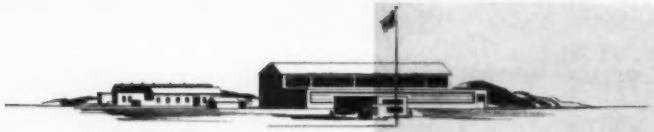
Please send complete data on Coppus-Dennis FANMIX Burners. I'm particularly interested in ☐ gas ☐ combination gas-oil.

Name.....Title.....

Company.....

Address.....

City.....Zone.....State.....



From B&W Research and Development . . .

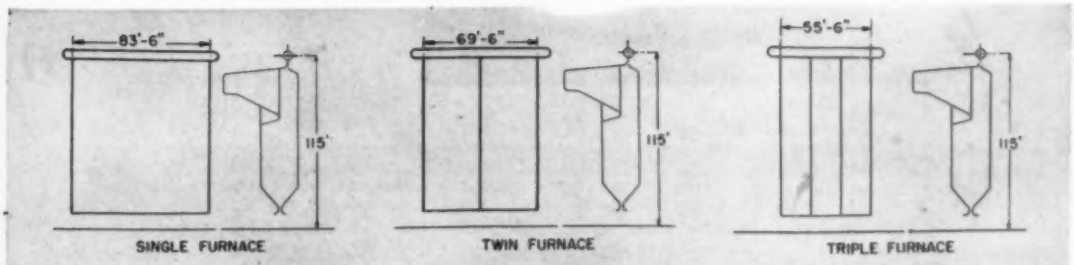
a practical solution to cost problems...

B&W DIVIDED

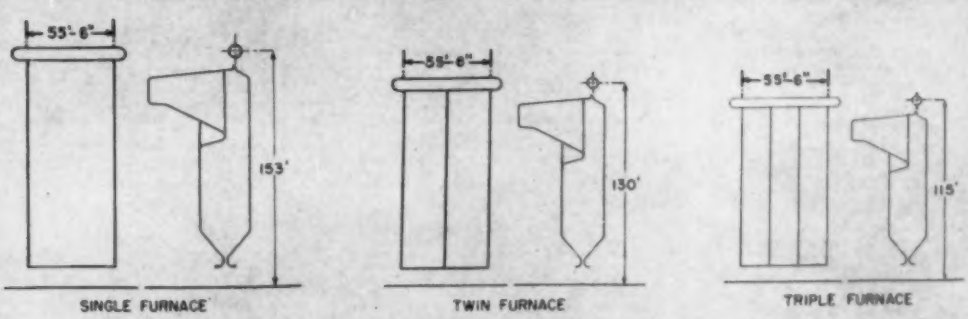
A practical, long-proved solution to rising construction costs may be found in the B&W Divided-Furnace Boiler. Whether it is a problem of conserving height, width, or both—especially for units with large heat input—B&W's Divided-Furnace design offers remarkable economies. The sketches on the opposite page show typical savings in space for twin-furnace and triple-furnace construction as compared with single-furnace construction.

A furnace division wall receives heat from both sides and therefore must be assured an adequate supply of water. With the B&W Cyclone-Steam Separator, circulation in division walls of B&W boilers has always been more than ample—as proved by long-term central station operation at boiler design pressures as high as 2650 psi. Many years of experience stand behind B&W's Divided-Furnace construction with all types of large units—Radiant, Stirling, and Open-Pass. Over 75 B&W Divided-Furnace Boilers are in operation—many for over 10 years—and more than 80 units are under construction, for the following electric utilities:

Alabama Power Company • Appalachian Electric Power Company • Arkansas Power & Light Company • Cincinnati Gas & Electric Company • City of Los Angeles • Cleveland Electric Illuminating Company • Commonwealth Edison Company • Consolidated Edison Company of N. Y. Inc. • Consolidated Gas, Electric Light & Power Company of Baltimore • Dallas Power & Light Company • Detroit Edison Company • Duquesne Light Company • Electricite France • Georgia Power Company • Houston Lighting & Power Company • Indiana & Michigan Electric Company • Jersey Central Power & Light Company • Kentucky Utilities Company • Long Island Lighting Company • Middle South Utilities, Inc. • Monongahela Power Company • Niagara-Mohawk Power Corp. • Northern Indiana Public Service Company • Ohio Edison Company • Ohio Power Company • Pacific Gas & Electric Company • Pennsylvania Electric Company • Philadelphia Electric Company • Public Service Company of Colorado • Public Service Company of Northern Illinois • Public Service Company of Indiana Inc. • Public Service Company of Oklahoma • Public Service Electric & Gas Company • Southern California Edison Company • Tennessee Valley Authority • Texas Electric Service Company • Texas Power & Light Company • Toledo Edison Corp. • Union Electric Company • West Penn Power Company • Wisconsin Power & Light Company



EFFECT OF DIVISION WALLS ON BOILER WIDTH—KEEPING HEIGHT CONSTANT



EFFECT OF DIVISION WALLS ON BOILER HEIGHT—KEEPING WIDTH CONSTANT

FURNACE

Division wall furnace construction is used in combination with other significant achievements of B&W Research and Development, including the Cyclone Furnace, Pressure-Firing, Gas Recirculation, and improved alloys for high steam temperatures. Widely accepted throughout the power industry, these modern B&W advances are making major contributions to more economical and reliable steam generation.

B&W's continuing program of progressive research combined with its broad experience in designing and building boilers with the highest capacities in existing pressure-temperature ranges, assure you of the most efficient and economical solutions to your specific steam generation problems.

ADVANTAGES OF DIVIDED FURNACE CONSTRUCTION

- Provides greater cooling area without increasing furnace volume
- Reduces steel and other material costs by keeping boiler and building volume to a minimum
- Lowers furnace construction costs
- Cuts operating costs by reducing slagging in furnace and in convection surface

Triple furnace boilers for 1 boiler—1 turbine units of over 200,000 KW capacity are now being constructed

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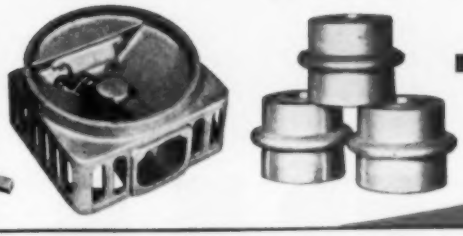

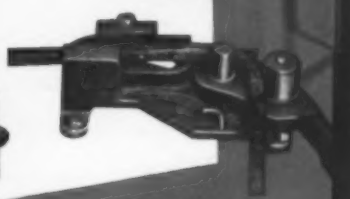

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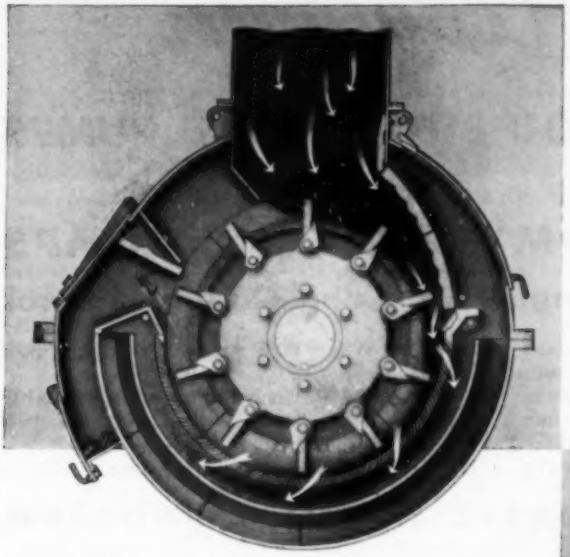


Crusher-Dryer Section

The crusher-dryer section, the first stage of the new Riley "50" pulverizer evaporates all free moisture in the coal if adequate primary air temperatures are provided so that moisture has no effect upon capacity or power consumption.

The crusher-dryer section not only dries the coal but it also rejects all foreign materials and crushes the coal to a fine granular state—at least 40% will pass a 50-mesh screen. This section also eliminates possibility of damage to the pulverizer by foreign materials as no material larger than ¼" can enter the final pulverizing stage.

Parts faced with tungsten carbides

To minimize maintenance and to assure long periods of continuous operation with sustained fineness, pulverizing elements are faced with tungsten carbide. A six-ton per hour Riley pulverizer equipped with tungsten carbide parts in September 1948 has pulverized over 80,000 tons of coal with no falling off of fineness and with but slight wear of tungsten carbide facing. See illustration of new and used parts at right. The use of tungsten carbide has greatly reduced maintenance material costs and tremendously reduced maintenance labor costs.

Riley "50" Pulverizers give you all these other significant advantages . . . .

- Quiet vibrationless operation
- Explosion proof
- Flexibility—wide load range
- Ability to carry extremely low loads
- Low power consumption
- Ease of regulation
- Small space required
- Minimum foundation cost
- Parts easily renewed
- Can be operated without coal feed
- Ease of ignition
- Low lubrication cost
- No worms or gears—Just two bearings
- High primary air temperatures

The Riley "50" pulverizer is the latest development in the coal pulverizing field. It will pay you to thoroughly investigate this significant pulverizer development when considering additional coal pulverizing equipment.

A survey of your Power Plant by a consulting engineer will possibly show ways of making surprisingly large savings in your power costs

COMPLETE STEAM GENERATING UNITS

. . . it will pay you to visit modern Riley Installations before purchasing Boiler or Fuel Burning Equipment

WATER-COOLED FURNACES • STEEL-CLAD INSULATED SETTINGS • AIR HEATERS

Look for Economy
WHEN YOU BUY HEATING PUMPS

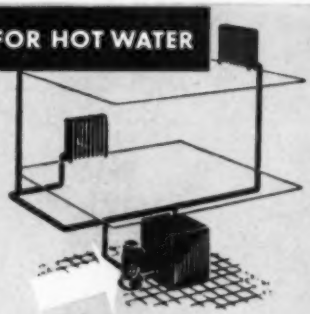
WHEELER-ECONOMY HEATING PUMPS
with Better-Than-Ever Engineering and Quality Control

With the consolidation of Economy Pumps, Inc. and C. H. Wheeler Manufacturing Company, the heating pumps you have always bought as "the best in the field" will now be sold as WHEELER-ECONOMY HEATING PUMPS. Representatives are being appointed in key areas to give you good service with a time-honored line of heating pumps that is now *better than ever.*

The Wheeler-Economy line of heating pumps has undergone a complete engineering check-up and re-analysis from the castings out. Many refinements have been made and a new face-lifting has been effected . . .

TYPES FOR EVERY BASIC HEATING PROBLEM

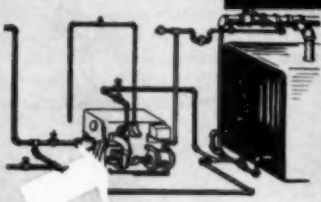
FOR HOT WATER



HOT WATER CIRCULATION

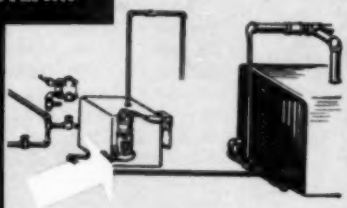
Wheeler-Economy Pumps deliver hot water to radiators quickly and return warm water to boiler with minimum heat loss.

FOR STEAM



STEAM VACUUM

The Wheeler-Economy Vacuum Producer is the most efficient design ever devised for removing air and water from condensate return lines.



RETURN CONDENSATION

Wheeler-Economy Pumps combine outstanding performance with low power cost in a compact dependable design.

WHEELER-ECONOMY HOT WATER CIRCULATING PUMPS

Type SCV—Vertical direct connected centrifugal pump. Sizes 1" to 3". Capacities to 500 GPM. Various RPM speeds 1150 to 3450. Heads to 225'.

Type SCC—Close coupled vertical or horizontal mounted. Sizes 1½" and 2". Capacities to 100 GPM. 3450 RPM. Heads to 120'.

TYPE SCV

TYPE SCC

WHEELER-ECONOMY VACUUM PUMPS

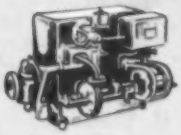
Type VV—Vertical Vacuum Pumps—Suitable for use on all ordinary jobs operating between 3 and 12 inches of vacuum. Made for all discharge pressures up to 150 lb. per sq.in. Capacity sq.ft. E.D.R. 2500 to 15,000. Single and duplex units.

Special Capacities—VVS and VVSD single and duplex units recommended wherever capacity of system or air leakage is greater than ordinary. Also where lifts or pockets in the returns necessitate carrying higher vacuum. (Example: 10 to 16 inches.)

Type SVA—Horizontal Vacuum Pumps—For ordinary jobs operating between 3 and 12 inches of vacuum. Discharge pressures up to 150 lb. per sq.in. Capacity sq.ft. E.D.R. 20,000 to 100,000. Single and duplex units.

Special Capacities—Styles SVS single unit and DVS Duplex Unit, recommended where air capacity or air leakage in the system is greater than ordinary. Also where lifts or pockets in return require the carrying of higher vacuum—example 10 to 16 inches.

TYPE VV



TYPE SVA

WHEELER-ECONOMY RETURN CONDENSATION PUMPS

Type E—Operate at 1750 RPM or for 50 cycle current at 1440 RPM. The best pump where extremely quiet operation is desired. Single and duplex units. Capacity sq.ft. direct C.I. radiation or equivalent: 1000 to 65,000.

Type EC—Available for the same or higher pressure than handled by Type E pumps. Operate at 3450 RPM. Units for 50 cycle current operate at 2880 RPM. Capacity sq.ft. direct C.I. radiation or equivalent 1000 to 65,000. Single and duplex units.

Vertical Underground Pump—Used where returns are below floor level or otherwise too low for horizontal pumps. Cast Iron tank can be installed flush with floor. No pit required for pump. Low and medium pressure units equipped with single stage pumps of vertical design. For higher pressure units a multistage pump of special design is used. Capacity in sq.ft. direct C.I. radiation or equivalent 2000 to 50,000. Single and duplex units.

Type S—Condensation Pump with Steel Receiver—An "Economy" installation where service is not severe and heavy construction cast iron tanks are not required. Where steel receiver is satisfactory and low cost is of primary importance Type S is recommended. However, these low cost models are the equal of the top grade in many competitive lines. Single or duplex units.

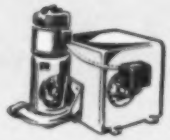
Type MR—Lightweight Pump for low pressure steam heating systems. Priced to meet competition . . . with no compromise in workmanship and materials. Capacities up to 65,000 sq.ft. E.D.R. Single and Duplex Units.

Types B and C—Horizontal Return Condensation Pumps—Type B multi-stage pump for pressures up to 150 lbs. 1750 RPM. Quiet operation. Capacities in sq.ft. direct C.I. radiation equivalent to 6000 to 65,000.

Type C multi-stage pump for pressures up to 175 lbs. 3600 RPM 60 cycle. Identical to type B except for higher speed operation. Capacities in sq.ft. direct C.I. radiation equivalent to 6000 to 65,000.

Type G—Horizontal Return Condensation Pump—Type G single suction, single stage designed for medium and high pressures at motor speeds 1800 to 3450 RPM. Receivers of all three types, "B", "C" and "G" are welded steel plate unless otherwise ordered.

All Wheeler-Economy Heating Pumps are tested before shipment and guaranteed for workmanship and materials.



TYPES E & EC

TYPE U

TYPE S

TYPE MR

TYPES B & C

TYPE G

SOME TERRITORIES STILL AVAILABLE FOR REPRESENTATIVES WHO QUALIFY

Over 15 million dollars' worth of these pumps are in use throughout the United States

126

WHEELER-ECONOMY PUMPS

ECONOMY PUMPS, INC. • DIVISION OF C. H. WHEELER MANUFACTURING CO.
19TH AND LEHIGH PHILADELPHIA 32 PA

The fittings that revolutionized pipe welding . . .

In the year 1931 Taylor Forge gave industry its *first real line* of seamless, butt-welding pipe fittings. We say it was the first *real* line because it was the first to include not only long and short radius ells, but also full branch and reducing tees, concentric and eccentric reducers, stub ends, caps and welding neck flanges.

This was a fully planned development. Many years before Taylor Forge had foreseen the future of the butt-welding fitting . . . had realized that pipe welding could not go beyond its then crude stage until pipe users were given *all* the fittings necessary to make up complete piping systems.

So Taylor Forge went to work on this and after long research and development came out with the full line that became the inspiration of modern pipe welding.

Naturally the organization that started ahead has kept ahead . . . in design, in quality, in breadth of line. That is why so many men who have followed the development of the WeldELL line, refuse to consider any other kind of welding fittings.

TF

For up-to-the-minute facts, see your Taylor Forge distributor

TAYLOR FORGE

TAYLOR FORGE & PIPE WORKS, General Offices and Works: P.O. Box 485, Chicago 90, Ill.
Offices in all principal cities. Plants at: Carnegie, Pa.; Fontana, Calif.; Hamilton, Ont., Canada

ALLIS-CHALMERS
COMPLETE DRIVES

Simplify

YOUR DRIVE DESIGN PROBLEMS

Allis-Chalmers Matched Motors, Control and V-Belt Drives Save Design Time and Cut Installation Cost

CONTROL

Complete matched control for any motor, including manual and magnetic starters, pushbuttons, and variable speed control.

MOTORS

Standard open drip-proof, splash-proof, totally-enclosed, fan-cooled and explosion-proof, ½ hp and up. Also wound rotor and direct current. Special motors to meet your requirements.

Texrope V-BELT DRIVES

Fixed speed and *Vari-Pitch* sheaves with stationary or motion control. Famous grommet belt construction. Most complete line of V-belt drive equipment in the industry.

Get the Kind of Help You Need

Allis-Chalmers representatives in every industrial center are at your command. Just call the office nearest you or write Allis-Chalmers, Milwaukee 1, Wisconsin for helpful literature.

Allis-Chalmers Motors and Control	51B6052
Texrope V-Belt Drives	20B6051

Texrope and *Vari-Pitch* are Allis-Chalmers trademarks.

A-3780

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

A nontechnical report to management concerning profits

They did what you can do to produce more

To produce more—yet maintain high quality—was the problem of this West Virginia Steel Mill.

Specifically, they asked Westinghouse engineers to help them develop a new line that would speed up the entire tinning process.

Westinghouse creative engineering did this:

> Utilized RF (Radio Frequency) Heating to speed up the reflow process.
>
> Designed a special control system to guard quality regardless of line speed.
>
> Developed a highly synchronized drive with advanced engineering features that ties together the entire complex line.

Result:—The world's fastest tinning line—operating three times faster than the average.

This same creative engineering applies to every industry, every manufacturing process. It is a part of the total Westinghouse services you can use to your profit . . . for application, installation, disaster, emergency or periodic maintenance.

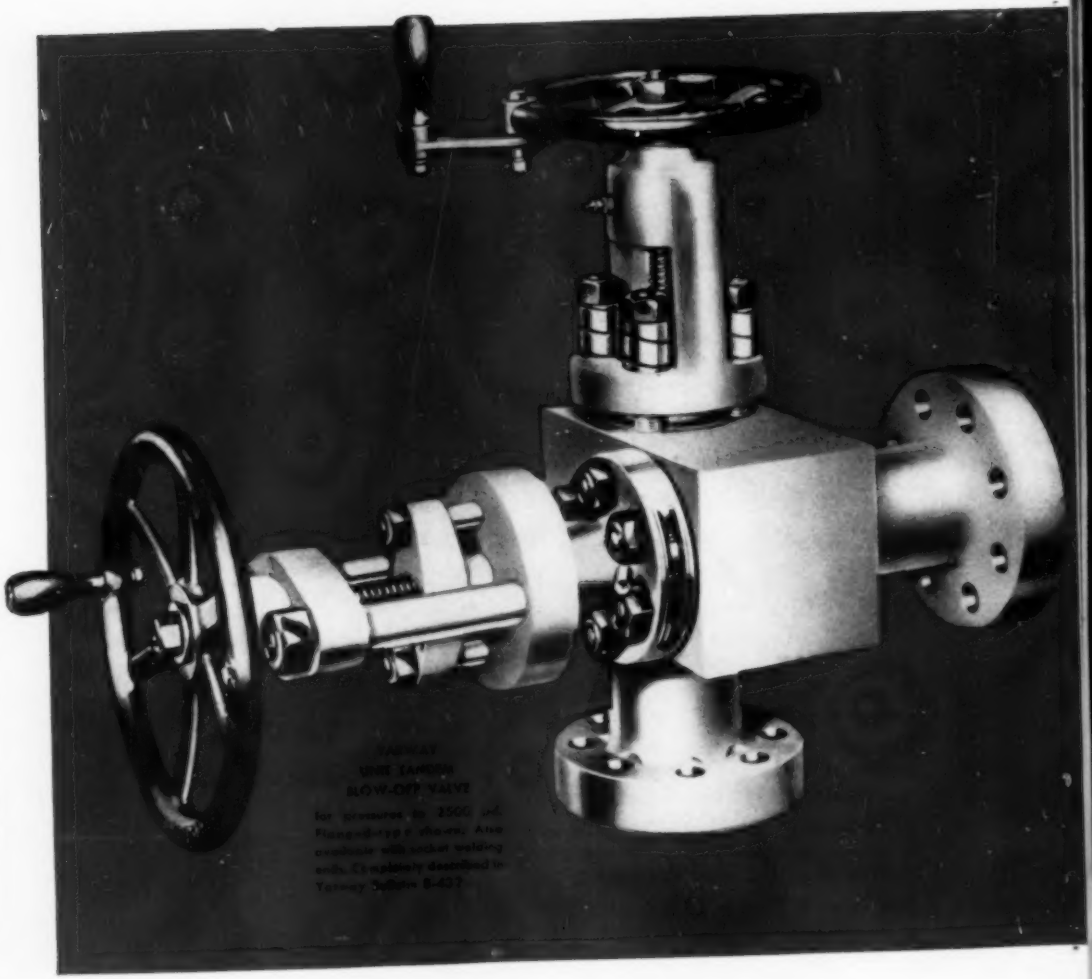
We want to do the kind of planning with you that applies these engineering services to your problem . . . to save time, to save money, to make money, to produce more with what you have.

Westinghouse Electric Corporation, Pittsburgh, Pennsylvania.

YOU CAN BE SURE...IF IT'S

Westinghouse

YOUR BOILER



YARWAY

IS WORTH A *GOOD* BLOW-OFF VALVE

Boilers represent sizable investments . . . certainly worth protecting with the most dependable boiler trim you can get.

You need good blow-off valves—valves that keep blow-down lines tight, don't wear, clog or leak, and are rugged enough to stand up under the severe shock of regular or emergency blowing-down under pressure.

Yarway Blow-Off Valves meet those requirements. Both Yarway Seatless Valves with balanced sliding plunger, and Yarway Stellite-faced Hard-Seat Valves embody the most recent developments in design and metallurgy.

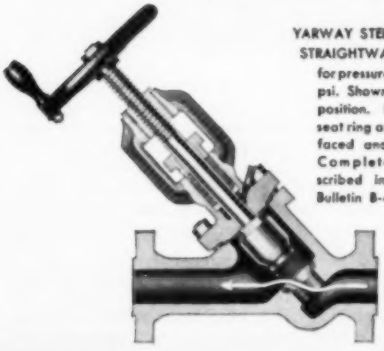
Engineers tell us the sturdiest of all blow-off valves is the Yarway Unit Tandem. This famous valve combines either a seatless and hard-seat, or two hard-seat valves, in a one-piece forged steel body. It is made for pressures up to 2500 psi. Other Yarway Blow-Off Valves meet lower pressure requirements.

It is significant that more than 15,000 plants throughout the world use Yarway Blow-Off Valves . . . and among the higher pressure plants, 4 out of every 5 are Yarway-equipped!

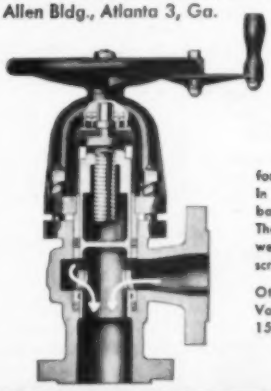
A Yarway bulletin will tell you in detail how these valves can protect *your* boiler investment. Write today, stating pressure range.

YARNALL-WARING COMPANY, *Home Office:* 116 Mermaid Ave., Phila. 18, Pa.

Southern Rep.: ROGER A. MARTIN, Bona Allen Bldg., Atlanta 3, Ga.



YARWAY STELLITE-SEAT STRAIGHTWAY VALVE for pressures to 2500 psi. Shown in open position. Disc and seat ring are stellite-faced and ground. Completely described in Yarway Bulletin B-432.



YARWAY TYPE "B" SEATLESS ANGLE VALVE for pressures to 400 psi. In open position. Notice balanced sliding plunger. There is no seat to score, wear, clog or leak. Described in Bulletin B-424.

Other Yarway Seatless Valves for pressures to 1500 psi.

Pressure-Seal Cast Steel Gate Valve

Small Cast Steel Angle and Y-Globe Valves for high-pressure service

Walseal Bronze Strainer

Walseal Bronze Globe Valve

Walseal Bronze Elbow

Walseal Bronze Union End Tee

Walworth is proud to be aboard the S. S. United States

When the United States Lines, the Newport News Shipbuilding & Dry Dock Company, and Gibbs & Cox, Inc., naval architects, join forces to build the fastest, safest and most modern liner the world has ever seen, the selected materials and components have to be top quality. Walworth Pressure-Seal Cast Steel Gate, Globe, and Angle Valves, and Walworth Small Cast Steel Angle and Y-Globe Valves for high-pressure service are installed in the main steam lines of the S. S. United States. Brass and copper lines use large numbers of Walseal valves, fittings, strainers, and unions.

Knowing that Walworth valves and fittings are a vital part of the power arteries aboard this great ship, the proudest moment of Walworth's 110 years of manufacturing experience came when the new Queen of the Sea broke both the east and west trans-Atlantic speed records.

As we present our compliments to Commodore Manning and his crew, to the Newport News Shipbuilding & Dry Dock Company and its men, and to William F. Gibbs and his staff, we also compliment the men and women of the Walworth Company who gave of themselves to put quality into our products and this quality ship.

WALWORTH

valves • fittings • pipe wrenches

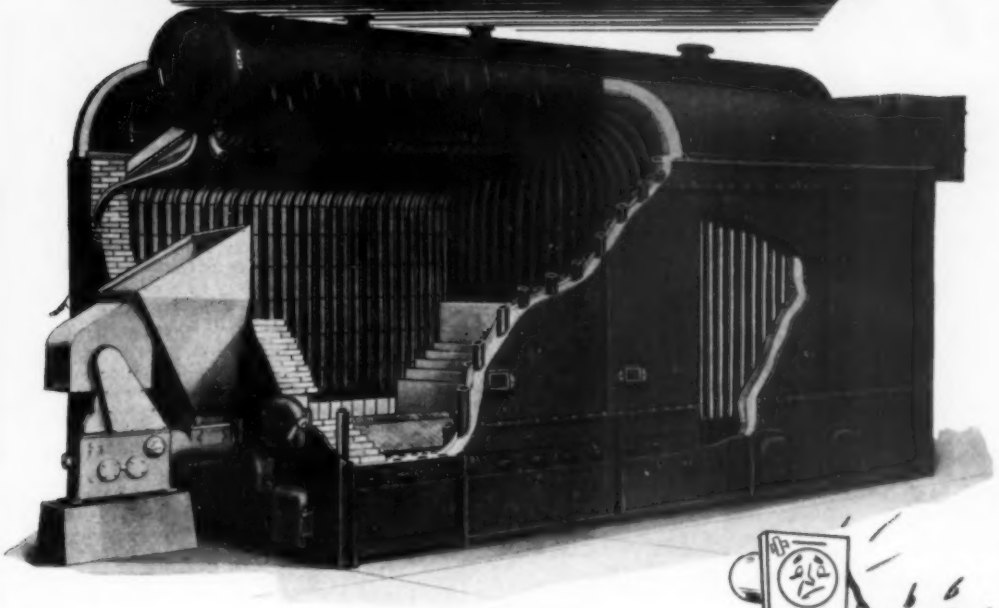
60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Formula for Saving Steam Dollars

300 h. p. (rated) ERIE CITY VL Boiler-Stoker unit

Factory Assembled!



Hundreds of Erie City VL Steam Generators are replacing old worn out fire tube boilers.

This modern 2-drum water tube boiler has integral water cooled refractory lined furnace—it may be stoker, oil or gas fired. It's completely factory-assembled in sizes 100 to 300 hp. to save in erection cost — in larger sizes for field erection.

A new 20 page catalog completely describes the VL. Ask for Catalog SB-43—no obligation.

COMPLETE STEAM POWER PLANT EQUIPMENT

ERIE CITY

Complete Steam Generators • Type C 3-Drum Boilers • Types VL & VC 2-Drum Boilers • "Economic" Boiler with or without Water Walls • Welded H. R. T. Boilers • Welded Steel Heating Boilers • "Keystone" Packaged Steam Generators • Coal Pulverizers • Underfeed and Spreader Stokers • Welded Pressure Vessels for the Process Industries.

ERIE CITY IRON WORKS • ERIE, PA. • *Since 1840*

Freedom to Sell is Vital to us All

Eight decades ago 70% of all gainful workers in the U. S. A. toiled in agriculture. Today farms and factories, put together, account for less than 40%.

Where do the rest serve? Chiefly in distribution, which includes the physical movement of products to buyers, and all forms of selling, advertising and sales promotion at the manufacturing, wholesale and retail levels, as well as the widely varied services related to the maintenance and use of American products.

With over 60% of our total labor force falling outside of farm and factory employment, obviously salesmen on the front line of selling contribute greatly to the productivity, prosperity and the world's highest standard of living enjoyed by the U. S. A.

Without sales a business fails and jobs vanish. No matter how good a product may be, it must be sold in competition with other goods. A salesman sometimes finds his products not truly competitive. He then exercises tremendous pressures on his employer for better products, lower prices, or both. Thus, competitive selling greatly influences the progress of American prosperity.

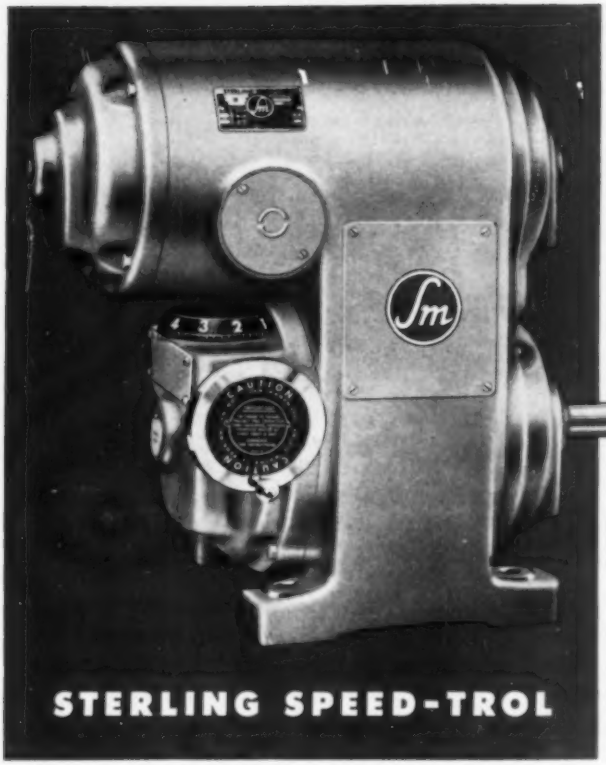
Countries where selling is inefficient, restricted or eliminated generate far less wealth, happiness and security.

Competition, especially competitive selling, is a great American Freedom. Let us preserve it to assure Progress For All Our People.

• • •

THE COMPETITIVE SYSTEM DELIVERS THE MOST TO THE GREATEST NUMBER OF PEOPLE

INFINITE SPEED VARIATION IN A SINGLE COMPACT UNIT



STERLING SPEED-TROL!

Sterling Electric Power Drives on our installations of grain elevators, tank agitators, mixed feed plants, oil mills, Rudy cotton conditioners and Pitco driers assure users of maximum production, minimum maintenance costs and greater plant safety by providing correct production speeds and infinite speed variation, where necessary, in single, compact power units, reports W. C. Pitts of W. C. Pitts & Son, Inc., Memphis, Tenn.

STERLING SPEED-TROL GIVES YOU VARIABLE SPEED CONTROL NECESSARY FOR:

EQUIPMENT ADAPTATION TO: Sequence synchronization—operators' abilities—load variations due to differences in quantity, quality, weight, size, tension, hardness or shape of material to be processed, machined, conveyed, blended, mixed, etc.

PROCESS CONTROL OF: Temperature—viscosity—level—pressure—flow—etc.

TIME CONTROL OF: Baking—drying—heating—cooking—pasteurizing—soaking—chemical action—etc.

With Speed-Trol you get the maximum in production, plant efficiency, quality and profit.

70 ILLUSTRATIONS showing how Sterling Electric Power Drives reduce production costs. Write for Bulletin No. A117.

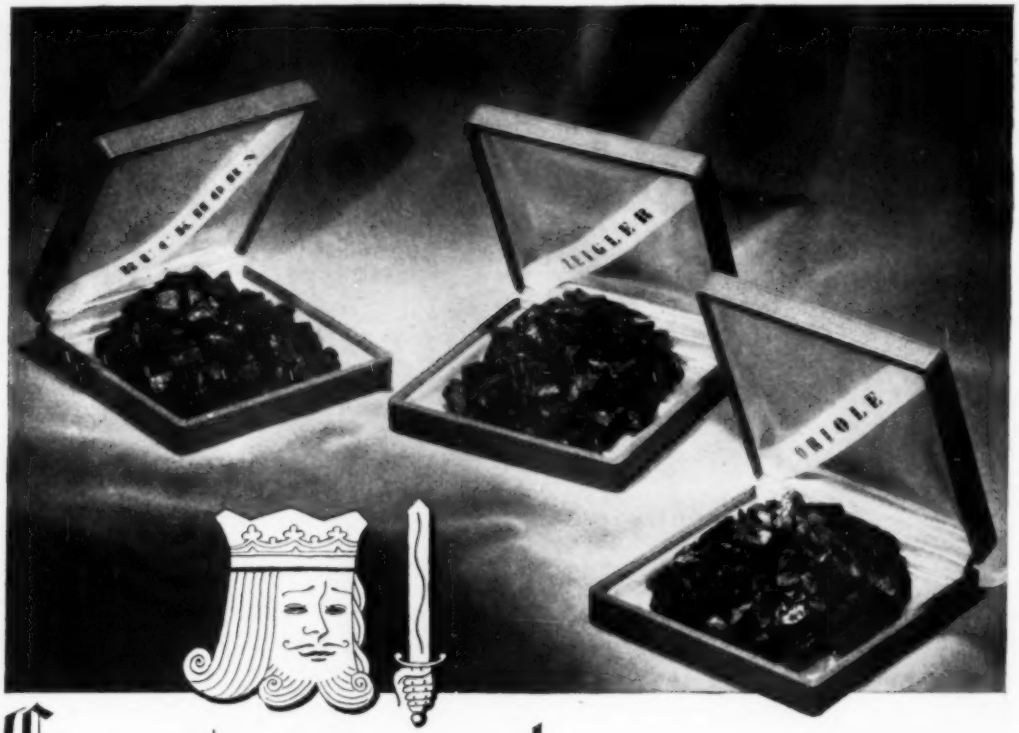
OTHER STERLING ELECTRIC POWER DRIVES:

- **STERLING SLO-SPEED (GEARED) MOTORS**
- **STERLING KLOSD AND KLOSD-TITE (NORMAL SPEED) MOTORS**

DRIP-PROOF • SPLASH-PROOF • TOTALLY ENCLOSED

STERLING ELECTRIC MOTORS

Plants: New York City 51; Van Wert, Ohio; Los Angeles 22; Hamilton, Canada; Santiago, Chile.
Offices and distributors in all principal cities.



Command performance! for BELL & ZOLLER COALS

Yes, every order for Bell & Zoller Coals is a *command performance.* Whether your specific requirements demand the characteristics of Buckhorn, Zeigler or Oriole, you are certain of receiving top-quality, incomparable performance.

Zeigler and heat-dried Buckhorn from Southern Illinois, and Oriole from Western Kentucky, are all superwashed, scientifically-cleaned coals . . . correctly sized and processed to meet rigid specifications. These free-burning, low ash, low moisture coals are top performers in keeping steam costs at a minimum.

Let us help you determine exactly what your coal needs are—in quantity, quality and cost. A Bell & Zoller combustion engineer will gladly arrange a consultation at no obligation. Telephone, write or wire our nearest office today.

SUPPORTING MEMBER COAL HEATING SERVICE NATIONAL COAL ASSOCIATION

BELL & ZOLLER COAL COMPANY

BELL BUILDING, CHICAGO 1, ILLINOIS

ST. LOUIS • NASHVILLE • OMAHA • MINNEAPOLIS

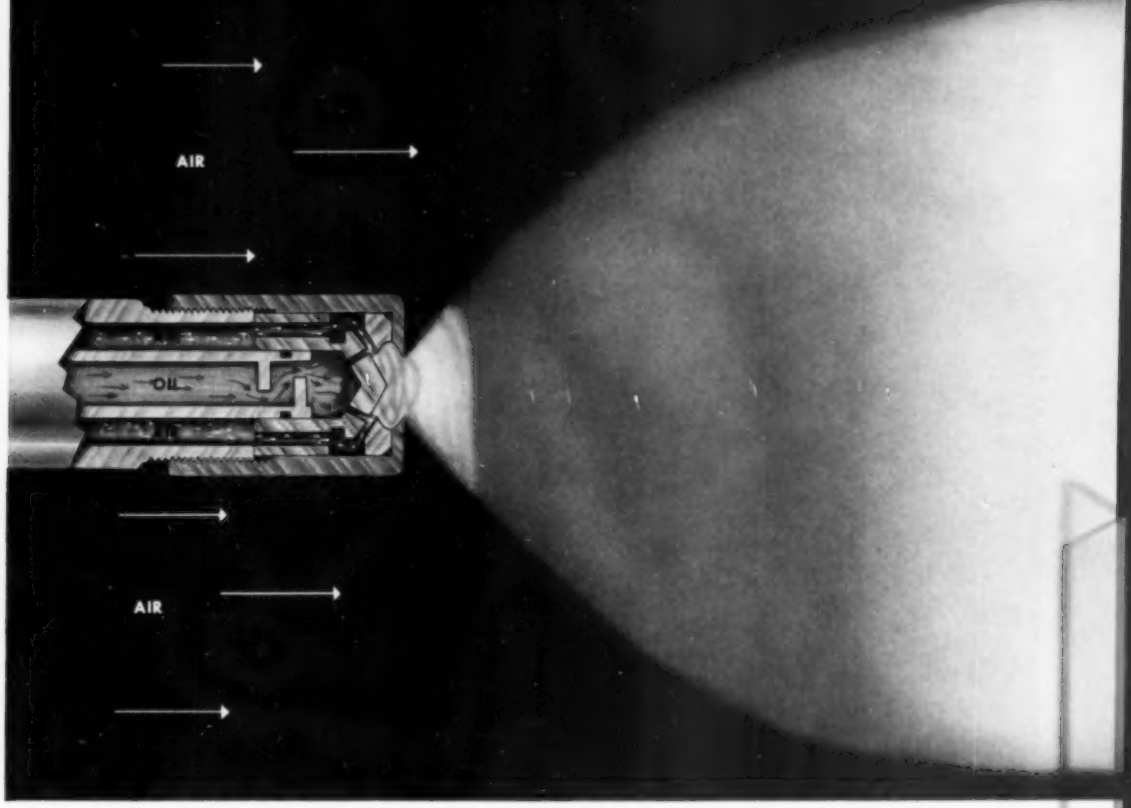
Sixty-Six Years of Service to Coal Users

Producers of
ZEIGLER, MOSS HILL, ORIOLE, MURDOCK, and BUCKHORN Coals

Sales Agents for
Otter-Creek Coal Company
Lockwood, West Virginia

Spring Hill Mining Company
Terre Haute, Indiana

Boone County Coal Corporation
Sharples, West Virginia



NOW—only Powermaster gives you VORIFLOW combustion!

LATEST DEVELOPMENT IN BURNER DESIGN REDUCES COSTS AND INCREASES BOILER EFFICIENCY

Here's what *Powermaster's* new VORIFLOW burner will do for you:

1. Saves fuel by providing infinitely variable combustion modulation in response to demand—with *full efficiency*—through wide range from 30% to 100% of firing capacity.

This means elimination of waste and maintenance headaches because of incomplete combustion. With the exclusive design of the VORIFLOW burner, tiny jets of compressed air pulverize every droplet of oil . . . projecting a fine fog of oil/air emulsion into the combustion area where it ignites and burns —immediately and completely. The VORIFLOW burner does away with outmoded mechanical spinning devices, globules of wasted oil, and gummy cleaning problems.

2. Slashes boiler maintenance costs.

There are *no* moving parts to wear out • There is *no* cup to clean daily. Routine cleaning of the burner once a month is sufficient • There is *no* burner vibration to throw adjustments "out of whack" • Parts are made of stainless steel, brass, and beryllium copper—they will last indefinitely.

3. The combination burner permits rapid change-over from one fuel to another—light oil, heavy oil, or gas.

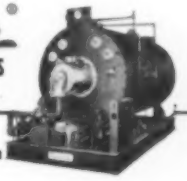
And when we say "rapid" we mean just that—the job can be done in four minutes. Modulating firing controls are ready to go into action at the flick of a switch. It isn't necessary to change the entire burner assembly. All you need to do to fire gas is to remove the oil nozzle.

Before deciding on a boiler for your plant, be sure to get the facts on the newest POWERMASTER with VORIFLOW combustion. Write for this catalog that gives you the entire story of the *Powermaster* packaged automatic boiler. Just drop us a line and we'll put one in the mail for you.

Powermaster®

PACKAGED AUTOMATIC BOILERS

In sizes to 500 HP, pressures to 250 psi.



ORR & SEMBOWER, INC. • Established 1885 • **1000 Morgantown Road, Reading, Pennsylvania**

How Gulf Periodic Consultation Service helps plants cut lubrication and maintenance costs

PERIODIC SERVICE CALLS KEEP PROGRAM CONTINUOUS AND UP TO DATE

When you adopt Gulf Periodic Consultation Service, Gulf Sales and Staff Engineers will help you set up a complete lubrication program—the kind of a program that has reduced maintenance costs in scores of plants.

These trained specialists will survey your equipment, provide simplified charts with practical lubricant recommendations, and suggest better application methods. They will also provide expert assistance on special problems that involve lubricants or lubrication.

Then, to keep the program up to date, they will make periodic service calls at your plant. On the occasion of these calls, they will note changed operating conditions that might affect the lubrication program. They will advise you regarding new developments in lubrication practice. And they will look for further means of reducing costs through improved lubrication.

Mail the coupon below for additional information on this cooperative plan. Or contact your nearest Gulf office.

GULF SERVES INDUSTRY

Gulf Oil Corporation · Gulf Refining Company SP1
719 Gulf Building, Pittsburgh 30, Pa.

Please send me, without obligation, a copy of the booklet "Gulf Periodic Consultation Service."

Name .....

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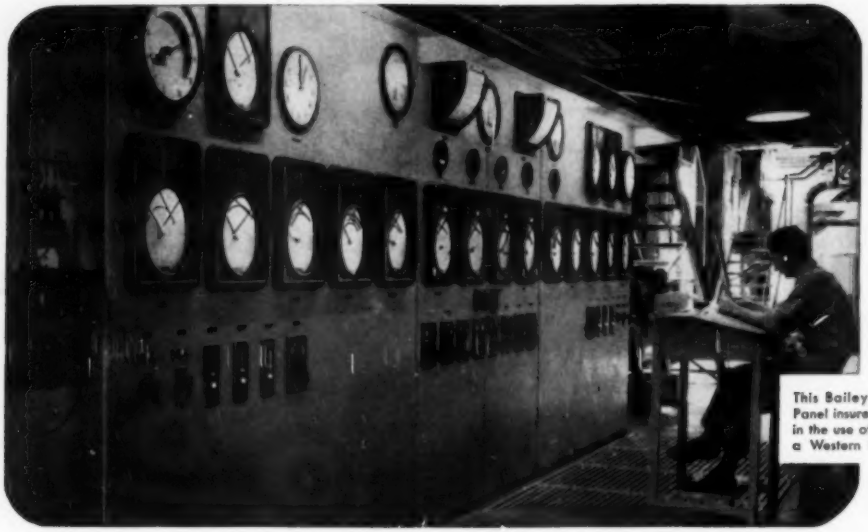


This Bailey Boiler Control Panel insures high efficiency in the use of Fuel-Dollars at a Western Chemical Plant.

What's Your Fuel-dollar Efficiency?

A dollar's worth of fuel has the *same potential* energy, no matter who's boiler it fires. But how much of the energy actually gets converted to a usable form depends on how you operate your boiler.

That's where Bailey Controls can help. And, here's why, we believe, you'll get better fuel-dollar efficiency with Bailey:

1. **Complete Range of Equipment—fully co-ordinated.** You need never worry that a Bailey Engineer's recommendation is slanted in favor of a particular type of equipment, just because he has a limited line to sell—or that Bailey will pass the buck for efficient control; we offer *complete* boiler control systems.

2. **Engineering Service—backed by experience.** No other manufacturer of instruments and controls can offer as broad an experience, based on successful installations involving all types of combustion, flow measurement and automatic control.

3. **Direct Sales-Service—conveniently located near you.** Bailey Meter Company's Sales-Service Engineers are located in more industrial centers than those of any other manufacturer of boiler control systems; you get prompt, experienced service with a minimum of travel time and expense.

For better fuel-dollar efficiency—for more power per fuel-dollar, less outage and safer working conditions, you owe it to yourself to investigate Bailey Controls. Ask a Bailey Engineer to arrange a visit to a nearby Bailey installation. We're proud to stand on our record: "More power to you!"

A-109-1

BAILEY METER COMPANY

1028 IVANHOE ROAD
CLEVELAND 10, OHIO

Controls for Steam Plants
COMBUSTION · FEED WATER
TEMPERATURE · PRESSURE
LIQUID LEVEL · FEED PUMPS

Have you a fly ash recovery problem?

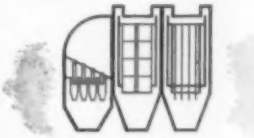
Bring it to WESTERN PRECIPITATION

. . . The Only Organization With Years Of "Know-How" In BOTH *Electrical* And *Mechanical* Recovery Methods!

If you have any kind of a suspension-recovery problem—whether dust, fly ash, fume, fog or mists—it will pay you to bring it to the leading organization in the field . . . WESTERN PRECIPITATION CORPORATION. Western Precipitation not only pioneered, over 44 years ago, the first commercial application of the now-famous COTTRELL Electrical Precipitators, but also has been a leader for many years in the *mechanical* recovery field with its widely-accepted MULTICLONE Collectors.

Result: **Western Precipitation is unsurpassed in the all-important factor of "know-how" in BOTH the electrical and mechanical fields . . . knows from years of first-hand experience whether your particular problem can best be solved by mechanical or electrical methods—*or by a combination of the two* . . . can give you a direct and unbiased recommendation on the matter . . . and then can provide the complete installation under *one* responsibility, *one* overall performance guarantee, even where Combination Multiclone-Precipitator (CMP) installations are made!**

Western Precipitation products and services include . . .



COTTRELL

Electrical Precipitators

. . . the most efficient recovery equipment for high recovery, long life, low maintenance on practically any type of suspensions, wet or dry. COTTRELLS can be designed to handle a few c.f.m. —or millions—with equal ease, and at virtually any operating temperature. Recovery efficiencies closely approach 100% recovery, if desired, with very low draft loss, minimum power costs and negligible labor costs. *By all standards, Western Precipitation* COTTRELLS *give highest recovery at lowest cost per-year-of-service!*

MULTICLONE

Mechanical Collectors

. . . the most efficient, most compact, most trouble-free mechanical equipment for recovering suspensions from gases. Because of their unique small-tube design, MULTICLONES are unsurpassed in mechanical recovery efficiencies—require less space, less maintenance, and are far simpler to install. No filters or screens to replace, nothing to burn or cause fire hazards, no high speed moving parts to repair or replace. These and many other advantages make MULTICLONE Collectors the logical choice on installations where mechanical recovery is selected.

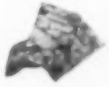
CMP UNITS

(Combination Multiclone-Precipitator)

. . . combine, in *one* compact installation, *both* mechanical and electrical recovery principles so that maximum benefit is obtained from the advantages inherent in each method. The MULTICLONE section centrifugally removes the larger and heavier suspensions (down to a few microns in diameter) . . . and the COTTRELL section then electrically removes the very small particles remaining in the gases. Thus, the bulk of the recovery is obtained with relatively low-cost equipment, and the final clean-up is obtained with equipment having unusually high recovery efficiency—approaching theoretically perfect, if desired.

The recovery of suspensions from gases is a highly exact science and every problem is different. Some require mechanical methods—others electrical methods—still others a combination of mechanical and electrical methods in proper balance to meet the individual requirements of each application. No matter what your problem, remember that only Western Precipitation has had years of field experience in BOTH mechanical and electrical methods!

Send for descriptive literature!



Let our experienced engineers study your recovery requirements and make an unbiased recommendation on the equipment best suited to your particular problem. A wire, phone call or letter to our nearest office places this unique "know-how" at your service, without obligation.

WESTERN Precipitation CORPORATION

ENGINEERS, DESIGNERS & MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

Main Offices: 1082 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA

CHRYSLER BLDG., NEW YORK 17 • 1 N. La SALLE ST. BLDG., CHICAGO 2

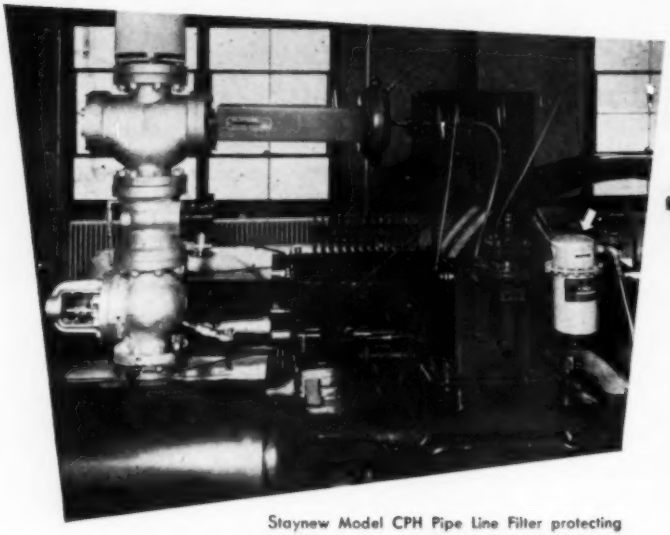
1429 PEACHTREE ST. N.E., ATLANTA 5 • HOBART BLDG., SAN FRANCISCO 4

PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

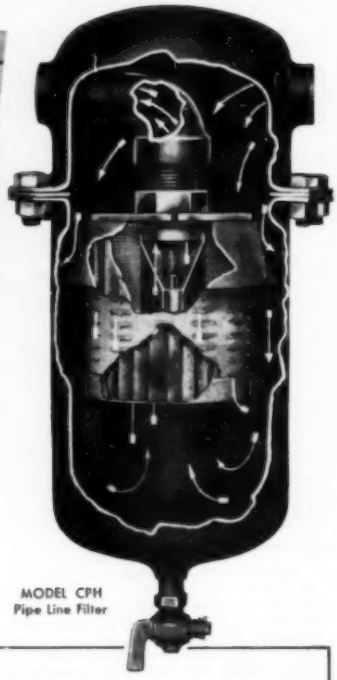
MULTICLONE—T.M. Reg.

STAYNEW PIPE LINE FILTERS

HELP KEEP THE PLANT OPERATING GROUP HAPPY



Staynew Model CPH Pipe Line Filter protecting throttling governor on Ingersoll-Rand XPV compressor at Long Island Lighting Co., Riverhead, L. I.



MODEL CPH
Pipe Line Filter

Failure to provide proper filtration can cause delays and breakdowns due to accumulation of rust, scale, foreign particles and condensed oil in pipe lines. This disrupts the cycle of production resulting in lost time and damaged materials.

Due to sound engineering design and construction, Staynew Pipe Line Filters give dependable day in and day out performance with minimum of maintenance . . . prolong the life of your equipment and help keep the plant operating group happy.

For quick action let our Engineering Department help solve your filtration problems. Write today for Bulletin B-1A.

USED ESPECIALLY FOR

- AIR OPERATED INSTRUMENTS
- AIR OPERATED TOOLS
- PNEUMATIC CONTROLS
- INDUSTRIAL PROCESSES

Representatives in Principal Cities

DOLLINGER PROTECTOMOTOR STAYNEW FILTERS

DOLLINGER CORPORATION

40 Centre Pk., Rochester 3, N. Y.

ALL TYPES OF FILTERS FOR EVERY INDUSTRIAL NEED

NO WEAK POWER LINKS

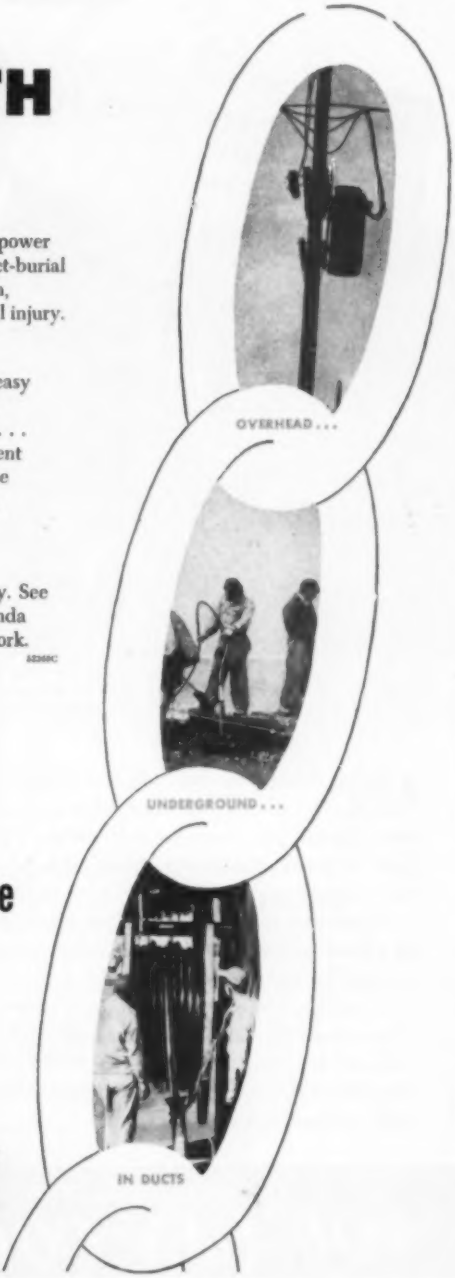
with DURASHEATH

ALL-PURPOSE DURASHEATH* can be used for every type of power and lighting application. In combined duct, aerial and direct-burial use, Durasheath effectively resists electrolysis, condensation, weathering, sunlight, organic decay, abrasion, and mechanical injury.

DURASHEATH COSTS LESS to install . . . because it is flexible, easy to handle, light in weight. It may be run in one continuous length *without expensive splicing*. It costs less to maintain . . . because its tough neoprene jacket can take terrific punishment in any use. It costs less to stock . . . because, instead of three cables, one – versatile Durasheath – meets every electrical distribution requirement.

SPECIFY DURASHEATH for economy, reliability, and durability. See your nearest Anaconda Sales Office or Distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

AD369C



the right cable for the job

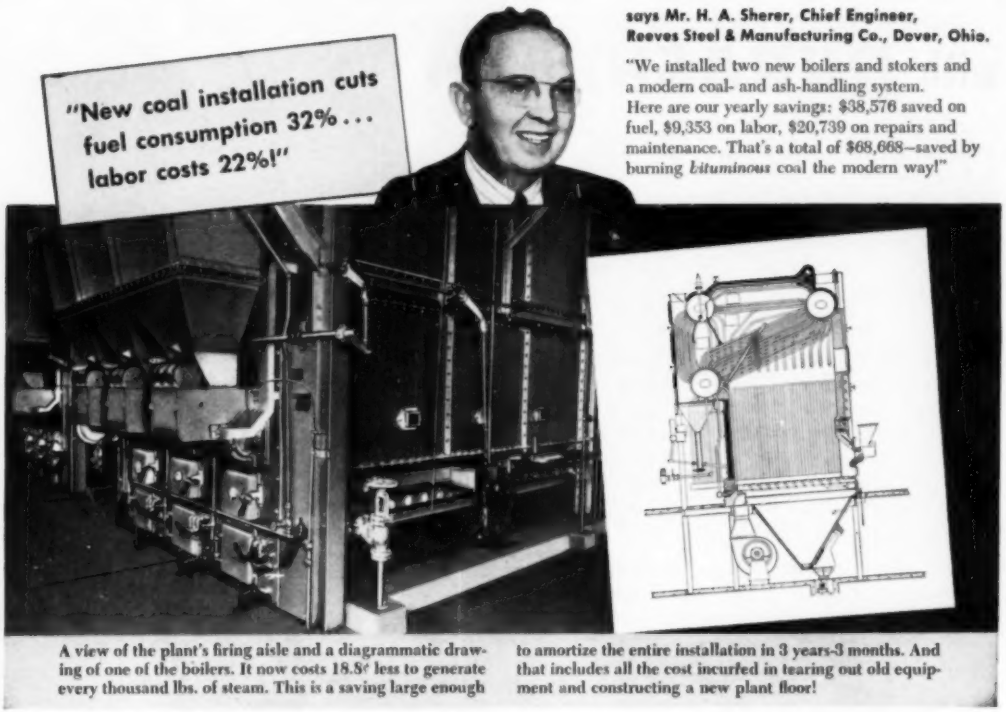
ANACONDA® wire and cable

for traffic control, airport† power and lighting, mines, industrial plants, railroads, street lighting, and many other uses.

available in all sizes—from large to small—single and multi-conductor.

*Trademark
†when ordered to CAA Specification E-824.

"WE SAVE OVER $68,000 A YEAR— BY BURNING COAL THE MODERN WAY!"



says Mr. H. A. Sherer, Chief Engineer, Reeves Steel & Manufacturing Co., Dover, Ohio.

"We installed two new boilers and stokers and a modern coal- and ash-handling system. Here are our yearly savings: $38,576 saved on fuel, $9,353 on labor, $20,739 on repairs and maintenance. That's a total of $68,668—saved by burning *bituminous* coal the modern way!"

A view of the plant's firing aisle and a diagrammatic drawing of one of the boilers. It now costs 18.5¢ less to generate every thousand lbs. of steam. This is a saving large enough to amortize the entire installation in 3 years-3 months. And that includes all the cost incurred in tearing out old equipment and constructing a new plant floor!

● Today, *bituminous* coal's inherent economy has been greatly increased. Modern combustion installations give you more steam for every dollar . . . automatic coal- and ash-handling systems cut labor costs to a minimum.

A consulting engineer can show you how coal can do a better job—*and save you real money*—in a plant designed to meet your *specific* needs.

In addition, with coal you get the basic advantages of price stability, and dependable supply. These advantages are assured by America's virtually inexhaustible coal reserves and the high productivity of America's coal industry.

If you operate a steam plant, you can't afford to ignore these facts!

COAL in most places is today's lowest cost fuel.

COAL resources in America are adequate for all needs—*for hundreds of years to come.*

COAL production in the U.S.A. is highly mechanized and by far the most efficient in the world.

COAL prices will therefore remain the most stable of all fuels.

COAL is the safest fuel to store and use.

COAL is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal net even bigger savings.

BITUMINOUS COAL INSTITUTE

A Department of National Coal Association, Washington, D. C.

FOR HIGH EFFICIENCY FOR LOW COST

YOU CAN COUNT ON COAL!

HALL can help find the answers to *Your* water problems . . .

here are a few examples:

METAL

2 miles of buried water mains, many service lines fed water-cooled elements of equipment in metal refining plant. Water left heavy scale on cooling elements, causing failure. Corrosion of main lines developed. Hall and the refinery stopped both scale and corrosion with Threshold treatment.

HALL

PAPER

Paper rejects were high due to poor sizing. Since water was blamed, Hall engineer made plant study, found that sizing procedure on one shift was not properly controlled. Situation was corrected and trouble stopped. Hall Engineer helped paper company find the trouble even though water wasn't responsible.

HALL

POWER

Routine check of 18,000 lb. per hr. boiler by Hall Service Engineer showed proper water conditions. Hard deposit found under normal sludge in mud drum was a "stopper." Hall report suggested heat leakage against drum. A check showed that packing between bridge wall and drum was gone. The Hall Engineer *predicted* the trouble in this case.

HALL

CHEMICAL

To speed up batch thermal processings of vegetable oils, plant engineers used extended-surface exchanger tubes. After repeated corrosion failures, Hall was consulted. Hall helped plant engineers effect design changes and set up chemical treatment. Processing units now stay in production.

HALL

WATER SUPPLY

Expanding plant needed more water. Before drilling new wells, Hall was consulted. Hall helped solve a stubborn slime problem, synchronized supply and demand, reduced water consumption 50%—then doubled well capacity with new well-cleaning method. Result: No new wells, plenty of water for planned expansion, money saved.

HALL

LET HALL ENGINEERS HELP SOLVE YOUR WATER PROBLEMS

▶ ***Write today for your copy of our bulletin on this subject.***

HALL PLANT WIDE WATER SERVICE • HALL PLANT WIDE WATER SERVICE • HALL PLANT WIDE WATER SERVICE

a subsidiary of

HAGAN CORPORATION

Consultants on:

- **Procurement**
- **Treatment**
- **Usage**
- **Disposal of Industrial Water**

HALL PLANT WIDE WATER SERVICE

HALL LABORATORIES, INC.

HAGAN BUILDING, PITTSBURGH 30, PA.

Please send me your bulletin: Let's Consider Your *Whole* Water Problem. SP-9

Name_____

Position_____

Company_____

Street & Number_____

City_____ Zone____ State_____

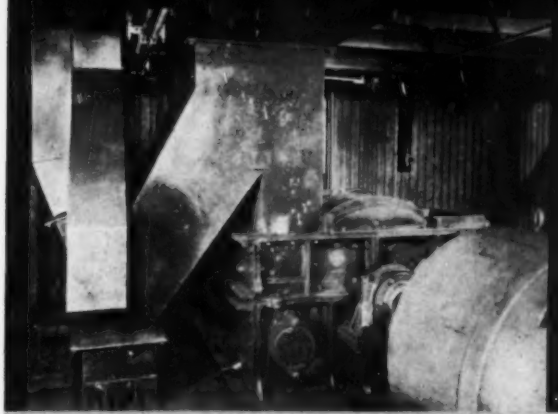
HALL PLANT WIDE WATER SERVICE

HALL PLANT WIDE WATER SERVICE • HALL PLANT WIDE WATER SERVICE • HALL PLANT WIDE WATER SERVICE

AMERICAN CRUSHER REPORT *from Otter Tail Power Co.*

150,000 TONS LIGNITE REDUCED TO 3/4"

...Without Single Repair or Maintenance!



AMERICAN RING-TYPE CRUSHER INSTALLATION at the Otter Tail Power Co.—equipped with 150 HP direct motor drive for reducing up to 8" lump lignite to ¾" product—at the rate of 275 tons per day.

CRUSHED LIGNITE BEING CONVEYED TO STORAGE BUNKER on 408-foot Link-Belt conveyor.

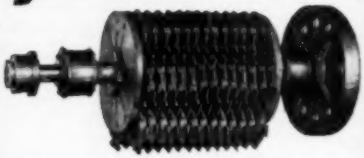
Since Nov. 18, 1950, this American AC3-C has been reducing ROM lignite and coal to a ¾" product—at the rate of 275 tons per day—for the Otter Tail Power Co., Ortonville, Minn.

This day-in and day-out performance record is notable for two reasons:

(1) Lignite, with lumps up to 8", makes up the bulk of the reduced fuel. Lignite is a tough, fibrous coal with high moisture content and a troublesome tendency to pack and cling.

(2) Not a single maintenance, repair or parts-replacement job has been necessary since installation. And the crusher is "still in very good condition with little or no indication of wear" according to the plant report.

HOW *American* DOES IT



Only American Rolling Ring Crushers have the patented manganese steel Shredder Rings that *split instead of crush* coal—resulting in a constantly uniform product with controlled fines, less maintenance and parts replacement.

Photos courtesy Link-Belt.

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1243 Macklind Ave. St. Louis 10, Mo.

Engineered "bum's rush"

Ashes and dust have been getting a faster, cleaner ride out of power plants ever since A-S-H went into the business of engineering systems in the middle 'twenties. Profiting by their past experience with these streamlined disposal methods, today's power engineers depend on us for the solution to their problems of tomorrow. If you have a plant that's still in the planning stage or one that needs modernizing, you'll do well to get your ash and dust handling answers from our seasoned staff.

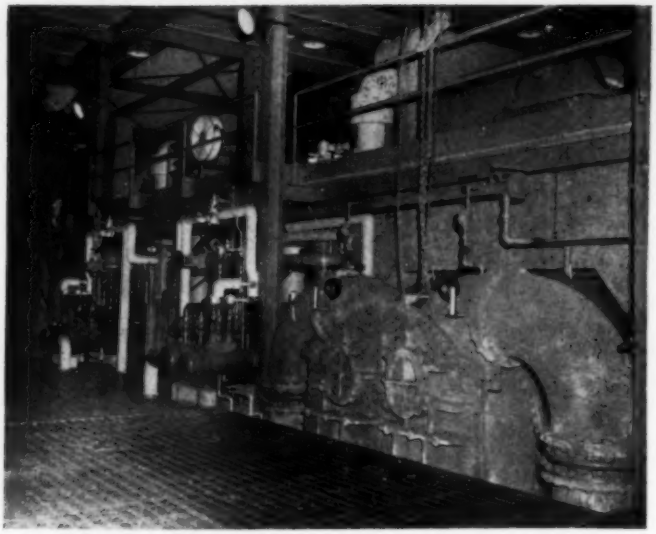
THE ALLEN-SHERMAN-HOFF CO., Dept. L—259 E. Lancaster Ave., Wynnewood, Pa.

Offices and Representatives in Principal Cities

HYDROJET (hydraulic) **HYDROVAC** (pneumatic)

materials handling systems

Undeniable Proof of



2—10,000 sq. ft. Divided Flow CONSECO Condensers installed in the Humboldt, Iowa, plant of the Corn Belt Power Co-Op. Shown alongside these units are the Twin-Element 2-Stage CONSECO Air Ejectors and Single-Stage Non-Condensing Hogging Ejectors.

CONSECO

PERFORMANCE

1947 2–10,000 sq. ft. units installed and in operation

1949 1–14,000 sq. ft. unit presently being installed

1951 1–14,000 sq. ft. unit being constructed

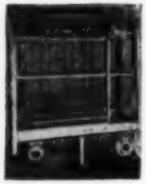
All in the Same Plant

CONSECO offers:

CLOSED HEATERS

CONSECO engineers are available at all times to meet your specific requirements in heat exchanger equipment. Their long experience and the complete fabricating facilities of Condenser Service are assurance of your obtaining maximum performance and economy. Send for illustrated engineering bulletins on CONSECO equipment.

DEAERATORS



BOILERS

EVAPORATORS

REFINER FILTERS

CONSECO **Condenser Service & Engineering Co.**
HOBOKEN, N. J.

LOW COST METHOD OF ELECTRICAL DISTRIBUTION

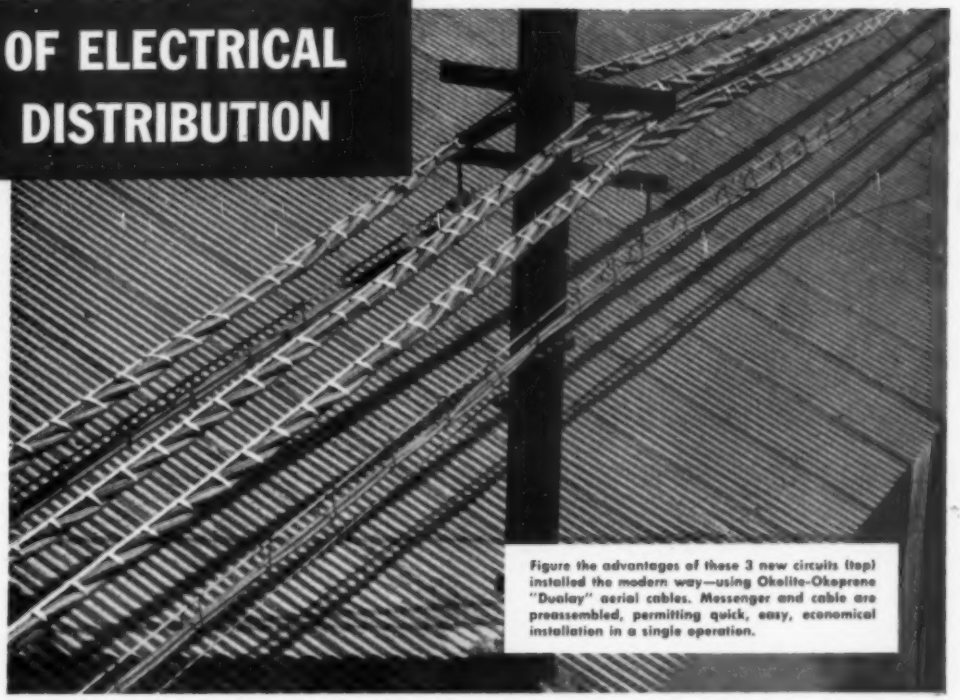


Figure the advantages of these 3 new circuits (top) installed the modern way—using Okolite-Okoprene "Duolay" aerial cables. Messenger and cable are preassembled, permitting quick, easy, economical installation in a single operation.

Okolite-Okoprene self-supporting aerial cable systems can solve a number of electrical cable problems in heavy power-consuming plants.

In such plants as steel, chemical, petroleum, glass, paper—or any fabricating and processing industry—an Okolite-Okoprene aerial cable system offers:

Money-saving advantages over duct systems.

Operational advantages over open wire circuits.

Preassembled Okolite-Okoprene self-supporting cable can be installed in a single operation quickly, easily and economically, often by making use of existing structures. Line taps and splices are simple. And of course there is no need for expensive trenching and ducting.

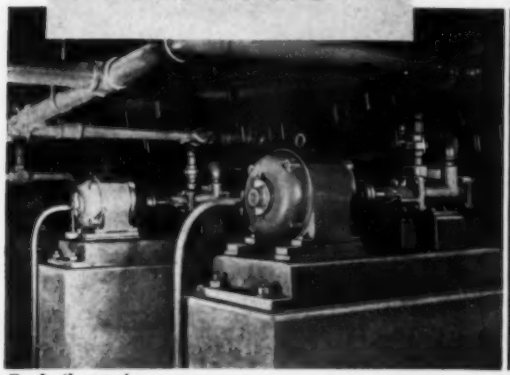
Because of its extremely high dielectric strength, Okolite-Okoprene gives better voltage regulation, eliminates flashover outages, and provides greater safety to personnel than conventional overhead wiring. Long, trouble-free service is assured by Okonite's famed processing methods. Premium materials, exclusive manufacturing techniques and proved formulas for insulation and sheath, combine to resist attack from moisture, heat, weather, dust- and acid-laden atmosphere.

Bulletin SP-1058 gives 52 pages of facts on why Okolite-Okoprene self-supporting aerial cable is truly an economical buy. Write for it today. The Okonite Company, Passaic, N. J.

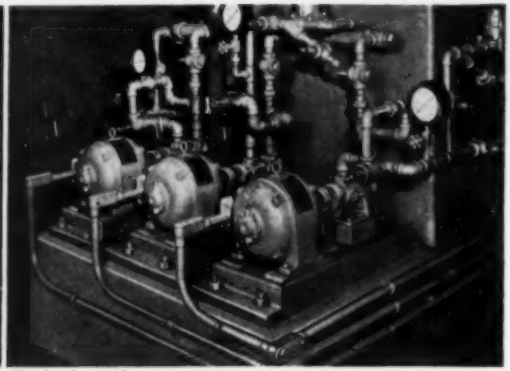
The best cable is your best policy.

OKONITE SINCE 1878 ***insulated wires and cables***

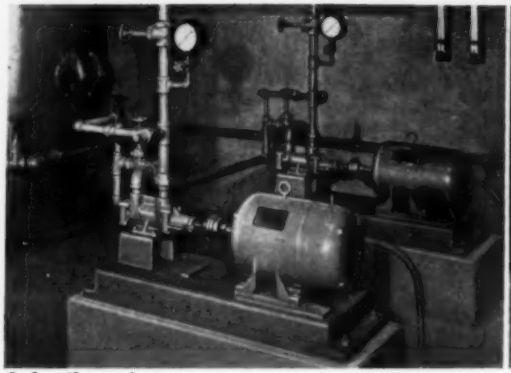
DE LAVAL IMO PUMPS *hold down 4 jobs at Owl's Head*



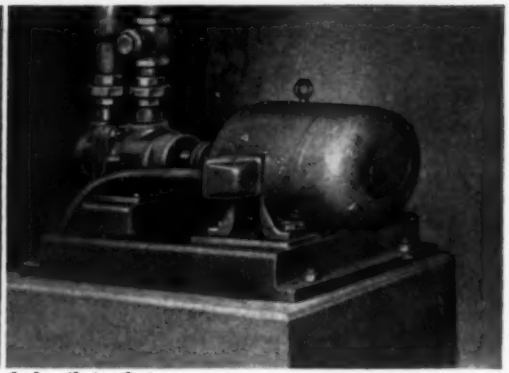
Fuel oil transfer



Fuel oil supply to engines



Lube oil transfer



Lube oil circulating

Again De Laval IMO rotary pumps prove their versatility. Eighteen of them are handling all the fuel and lube oil services for the six National Supply Company dual-fuel engines in the new Owl's Head sewage treatment plant in Brooklyn, New York.

The unique IMO design—*with only three moving parts*—assures long, trouble-free performance. IMO pumps are quiet, pulsation-free, compact and excellent for direct-connected high-speed operation.

Whether your power source is dual-fuel, gas or diesel engine, or oil-fired steam, be sure to specify IMO pumps for your next oil handling job. Use them in high and low pressure fuel oil burner sets, pumping fuel oil to burners, unloading and transferring fuel and diesel oil, handling oil for lighting off service and providing pressure lubrication on pumps and turbines. Send for Bulletin LG showing complete IMO line for capacities to 1,000 gpm at pressures to 500 psi and for capacities to 150 gpm at pressures to 1,500 psi.

DE LAVAL *IMO Pumps*

DE LAVAL STEAM TURBINE COMPANY
Trenton 2, New Jersey

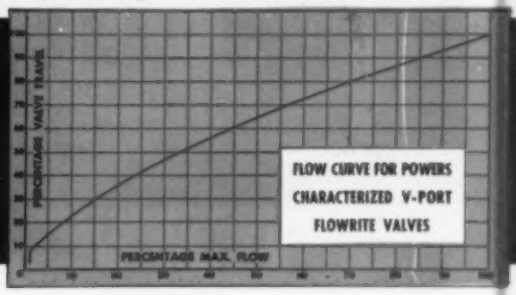
DL-187

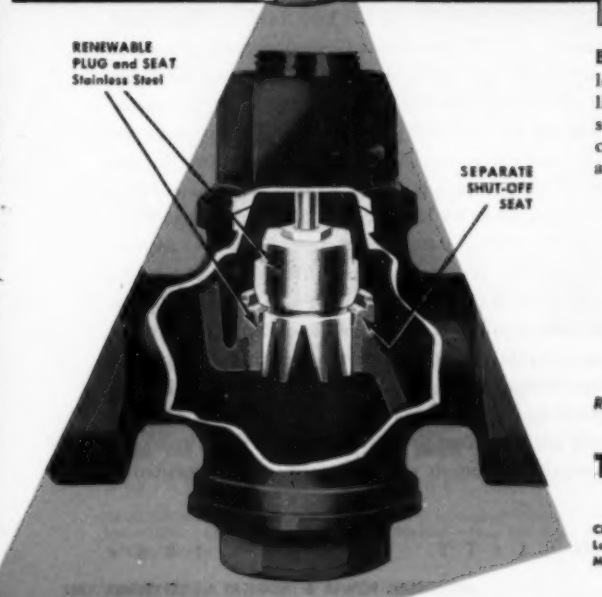
VALVE TOP—Durable moulded neoprene diaphragm (1) has positive sealing bead which provides increased sealing action with increasing control pressure. Efficient diaphragm form insures ample and constant operating power thru full travel. Piston Plate Assembly (2) has a free floating thrust plate which absorbs side thrust. Closely guided piston plate maintains stem in accurate alignment. Maximum air pressure in top, 22 psi.

POWERS® SINGLE SEAT V-PORT *Characterized* FLOWRITE VALVES Give—

Special Flow Characteristics—High lift V-Port plug provides proportional flow throughout entire lift of stem as shown in chart below.

Wide Variety of Valve Sizes—Nine sizes are available, ½" thru 2". The ½" valve can be furnished with plugs to give 15%, 30%, 60% or 100% of maximum capacity. Plugs are easily interchangeable without removing valve from line.





Better Control—Less Maintenance—Superior design of stainless steel plug and seat reduces wire drawing, insures longer life and tight shut off. V-Ports do the throttling, protecting separate shut off seat. Plug and seat are truly removable and can be easily replaced in the field. Inner valves are machined and precision ground and lapped within very close tolerances.

Low Hysteresis—Due to smooth rolling diaphragm and polished stainless steel stem in preformed lubricated packing.

Easy to Adjust—Ball bearing adjusting screw; rust proofed steel calibrated springs with full travel in 5 or 10 psi.

Easy to Install—Powers Flowrite V-Port valves have double unions and bronze body with rugged construction to withstand piping strains.

Easy to Service—Valve and top are easy to take apart and re-assemble, facilitating inspection and maintenance.

Reasonably priced. Contact our nearest office for prices and assistance in selecting proper size valves

THE POWERS REGULATOR CO.

SKOKIE, ILLINOIS • Offices in Over 50 Cities

Chicago 13, Ill., 3819 N. Ashland Ave. • New York 17, N. Y., 231 E. 46th Street
Los Angeles 5, Cal., 1808 West 8th Street • Toronto, Ontario, 195 Spadina Ave.
Mexico, D. F., Apartado 63 Bis. • Honolulu 3, H. I., P. O. 2755—680 Pilkoi at Kong

142 Spring St. N.W., Atlanta, Ga.

OVER 60 YEARS OF TEMPERATURE AND HUMIDITY CONTROL

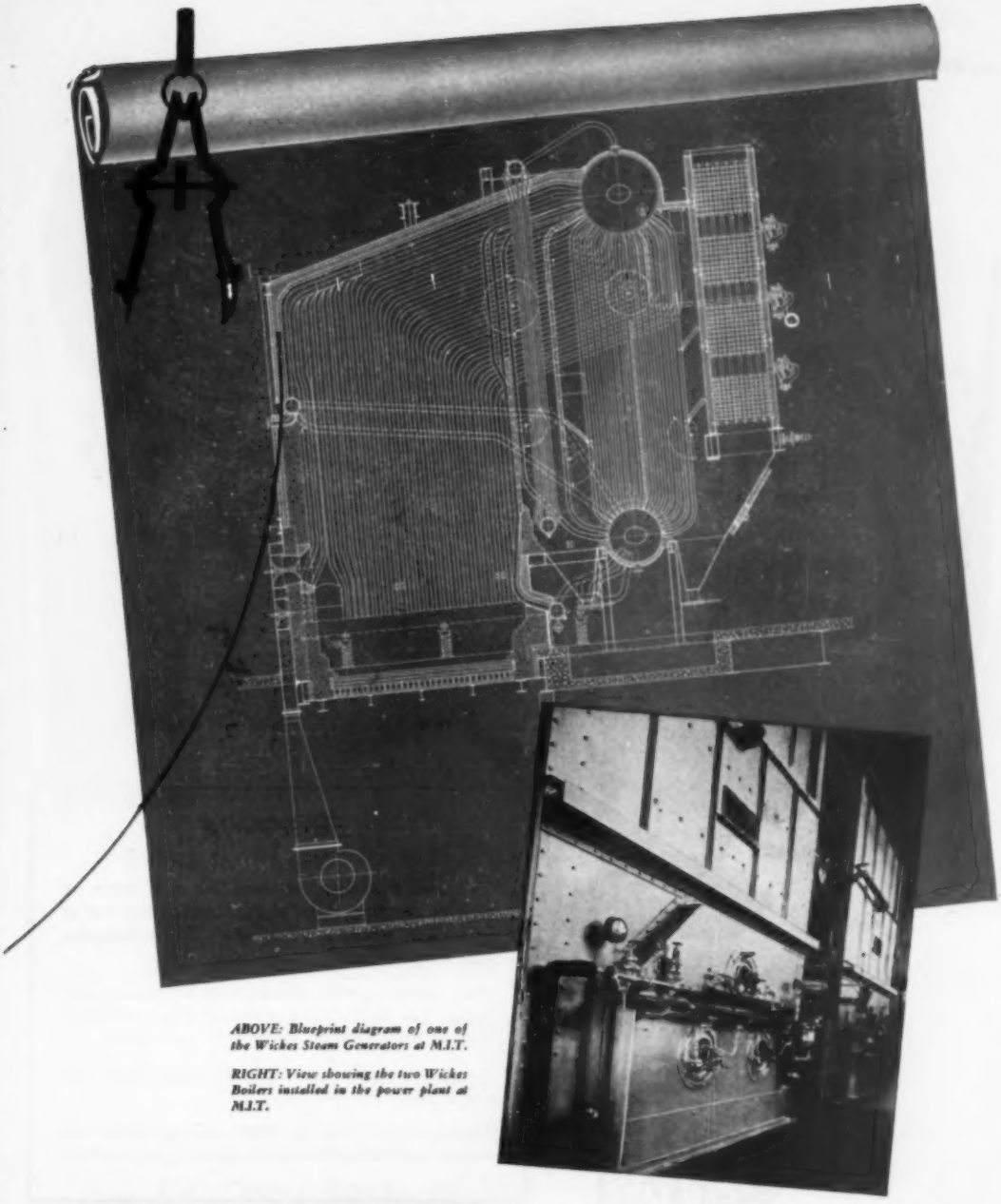
(a70)

M.I.T., famous engineering school, uses WICKES boilers for steam production

Consultants — JACKSON & MORELAND, ENGINEERS of Boston, Mass.

AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY, where sound engineering principles are taught, two Wickes Steam Generators were selected to supply heat for several new buildings including the Hayden Library and Sloan Metals Research Laboratory. The Wickes Boilers, which were custom-engineered for M.I.T., produce 160,000 lbs., of steam per hour. They occupy the same space formerly occupied by the two old boilers that produced only 40,000 lbs. per hour. They are equipped with superheaters and economizers. The new boilers are oil-fired at present but are engineered for ready conversion to spreader stoker if desired. They are designed for quick steaming to meet emergency power requirements and are fitted with thermowells and openings for taking flue gas samples so the students at M.I.T. can run boiler tests as part of their instruction. The installation of these boilers, an extremely difficult job because of the close erection tolerances, was handled by Flagg, Brackett & Durgin, Inc., Wickes' agents in Boston. ✓ ✓ ✓ Wickes can fill your requirements for steam generators up to 250,000 lbs. per hour and 1000 psi.—all types of multiple drum boilers adaptable to any standard method of firing; oil, gas, underfeed or spreader stoker. Write today for descriptive literature or consult your nearest Wickes representative.

RECOGNIZED QUALITY SINCE 1854



ABOVE: Blueprint diagram of one of the Wickes Steam Generators at M.I.T.

RIGHT: View showing the two Wickes Boilers installed in the power plant at M.I.T.

WICKES

THE WICKES BOILER CO.

142

DIVISION OF THE WICKES CORPORATION • SAGINAW, MICHIGAN

SALES OFFICES: Atlanta • Boston • Buffalo • Chicago • Cincinnati • Cleveland • Denver • Detroit • Greensboro, N.C. • Houston • Indianapolis • Los Angeles • Memphis • Milwaukee • New York City • Pittsburgh • Portland, Ore. • Saginaw • Springfield, Ill. • Tampa, Fla. • Tulsa • Washington, D.C.

NAVCO "Universal" PIPE SUPPORTS

Vertical adjustment up to 2½ inches can be made.

Support may be turned to any angle of 360°.

Will take care of 8 inches of travel.

Features

Universal Pipe Supports hold the pipe down as well as up. They prevent pipe from getting out of alignment, which is usual when Roller Supports are used.

They permit control of expansion movement and insure the desired free action of Slip Expansion Joints so essential in tunnel and duct work.

Expansion movement of pipe will not disturb the insulation.

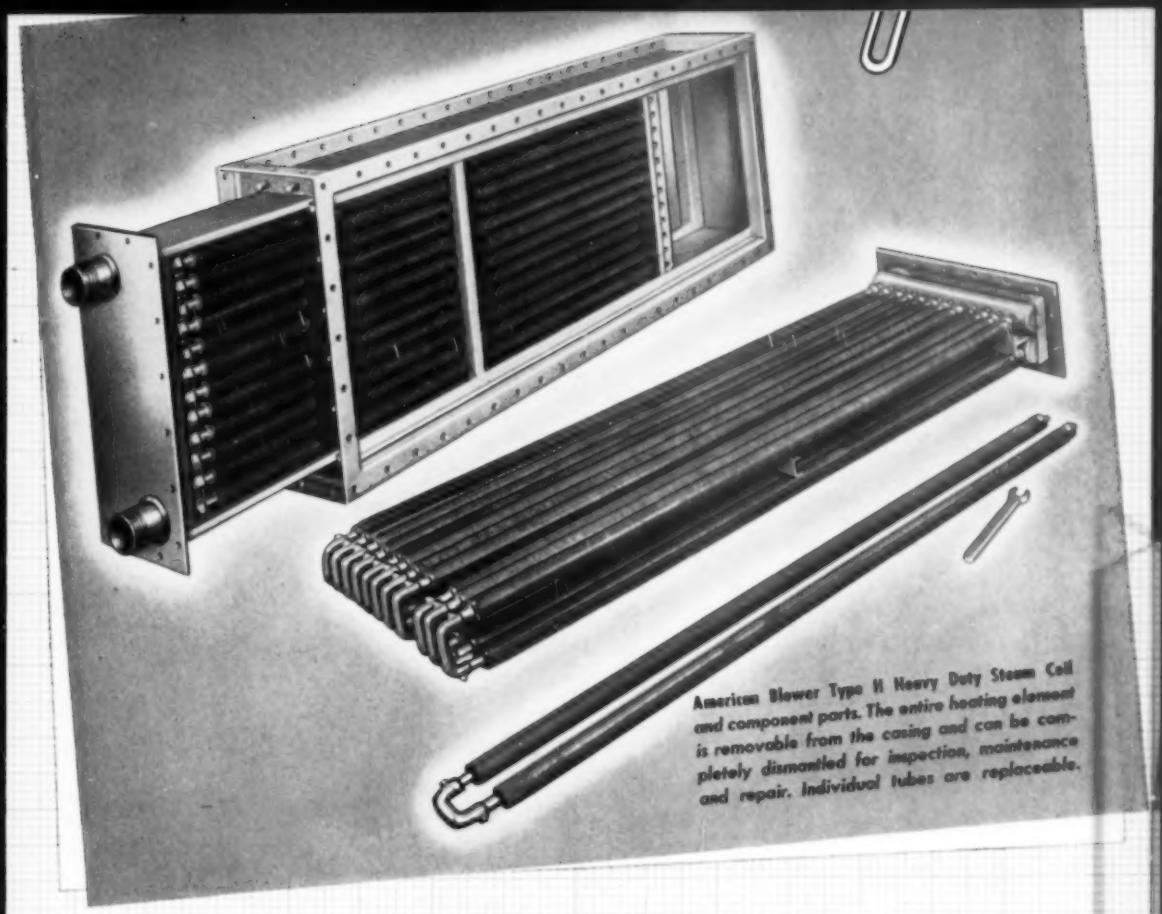
Made in Cast Iron or Steel and provided with forced lubrication for lines exposed to the weather.

NAVCO

NAVCO PIPING

NATIONAL VALVE & MANUFACTURING COMPANY • PITTSBURGH, PA.

NEW YORK • CHICAGO • CLEVELAND • BOSTON • ATLANTA • TULSA • BUFFALO • CINCINNATI



American Blower Type H Heavy Duty Steam Coil and component parts. The entire heating element is removable from the casing and can be completely dismantled for inspection, maintenance and repair. Individual tubes are replaceable.

Memo to Power Plant Men —

American Blower Heavy Duty Steam Coils were developed for you for the sole purpose of providing a heating coil possessing great strength ... corrosion resistance ... ease of maintenance, and complete accessibility.

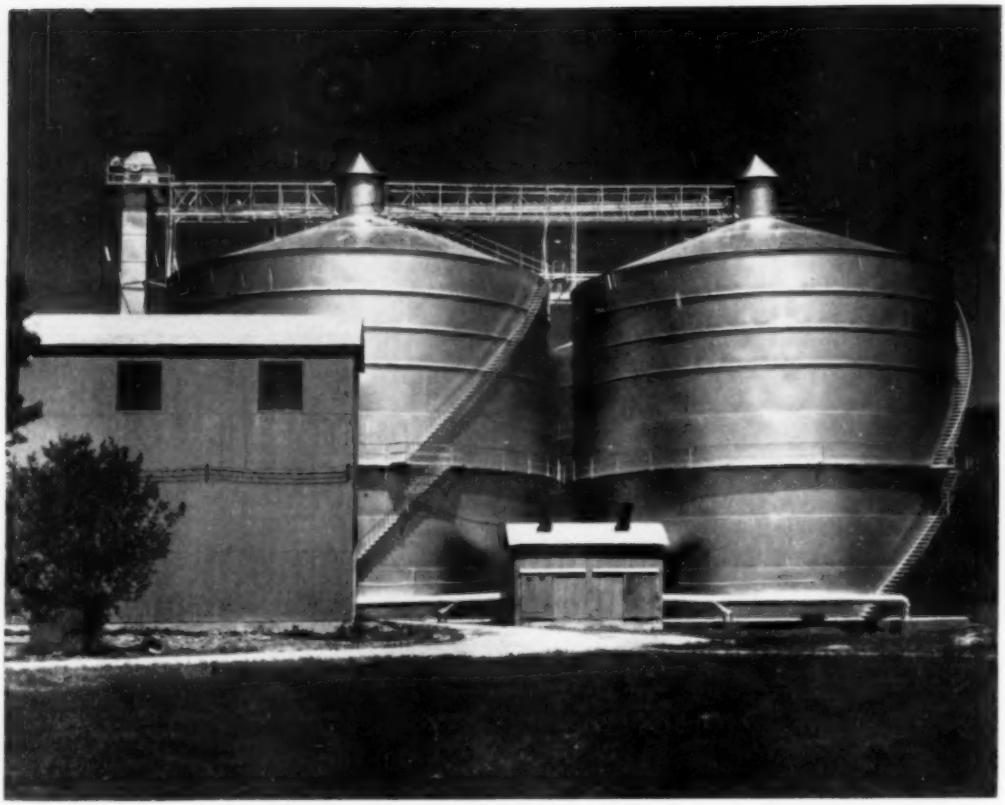
For heavy loads at high pressures, investigate them now!

AMERICAN BLOWER

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO
Division of American Radiator & Standard Sanitary corporation

Serving home and industry

AMERICAN-STANDARD • AMERICAN BLOWER • ACME CABINETS • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON



Soybean Storage at an Arkansas Processing Plant

Osceola Products Company of Osceola, Arkansas, manufacturers of cottonseed and soybean products, installed these two 70-ft. diam. by 60-ft. Horton steel soybean storage tanks because they were more economical to erect and will provide more efficient, longer lasting storage facilities than less durable structures. Each of these welded steel structures will hold 200,000 bushels of soybeans.

Careful steps are taken to thoroughly clean all soybeans before they are stored in these tanks. The tanks are ventilated by a submerged duct system to prevent heating, and subsequent damage, to the beans. Air is pulled through the beans by two 60-in. fans located in the small building shown in the center of the picture. Exhausts for the fan are seen protruding from the top of the fan house.

Osceola Products Company are extractors of cottonseed and soybean oils and manufacturers of cottonseed and soybean products. They process approximately 500,000 bushels of soybeans annually, which are purchased from farms within a radius of 75 miles of the plant.

The daily plant production of soybean oil is about 50,000 pounds. It is shipped in tank cars to manufacturers throughout the United States for use in making such products as shortening, margarine and salad oils. Soybean meal, left after the oil is extracted, is shipped to feed manufacturers here and abroad for use as livestock feed. Pellets of soybean meal are shipped to live stock growers for feeding on the range.

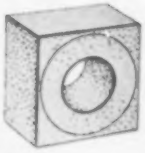
These soybean storage tanks are typical examples of the types of steel structures we are equipped to fabricate and erect. You can depend on our experience and facilities for building all types of storage or processing equipment. Write our nearest office for further information and quotations. There is no obligation on your part.

CHICAGO BRIDGE & IRON COMPANY

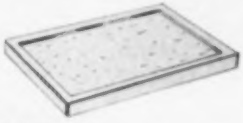
Atlanta 3.....2180 Healey Bldg.
Birmingham 1.....1531 North Fiftieth St.
Boston 10.....1044—201 Devonshire St.
Chicago 4.....2107 McCormick Bldg.
Cleveland 15.....2218 Guildhall Bldg.
Detroit 26.....1534 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston 2.....2132 C & I Life Bldg.
Los Angeles 17....1545 General Petroleum Bldg.
New York 6.....3312—165 Broadway Bldg.
Philadelphia 3....1646—1700 Walnut St. Bldg.
San Francisco 4.....1531—200 Bush St.
Seattle 1.....1345 Henry Bldg.
Tulsa 3.....1628 Hunt Bldg.
Washington 6, D. C.....1114 Cafritz Bldg.

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, *and* GREENVILLE, PA. *In Canada*—HORTON STEEL WORKS. LIMITED. FORT ERIE. ONT.

"Here's why I keep a stock of Kaocast on hand!"

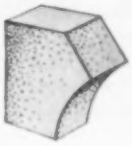


BURNER BLOCKS
Kaocast lasted 3 to 6 times as long as previous refractory. Still going strong.



DOOR LININGS
Kaocast lasted 3 to 6 times as long as previous refractory — cut installation cost in half.

TUNNEL KILN CAR TOPS
Ordinary fireclay crumbled after few trips. Kaocast lasted 30 trips without deterioration.



SPECIAL SHAPES
Kaocast special shapes cast over week-end to meet production demands.

The Chief Engineer of a mid-western power plant finds B&W Kaocast so *versatile* that he always keeps a ton or more on hand for miscellaneous jobs. This is only one of hundreds of plants in a list of diversified industries which are discovering practical, time-and-money-saving uses for this unique 3000 degree refractory castable. The panel at right gives a few examples.

There are good reasons for these Kaocast "success stories". This jack-of-all-refractories can be molded in a hurry *by you, when you need it.* It can be cast directly in place or applied by cement gun. Kaocast not only makes possible faster repairs and eliminates the need for a large inventory of special shapes, but it also stays on the job. That's because Kaocast has high resistance to spalling and slag attack, low volume change and negligible re-heat shrinkage.

Get all the data on easy-to-use, versatile Kaocast from your B&W Field Engineer. His specialized experience is an important B&W "extra".

KAOCAST is another important refractories development by B&W engineers who have continuously established new standards in industrial furnace refractories for the past 30 years.

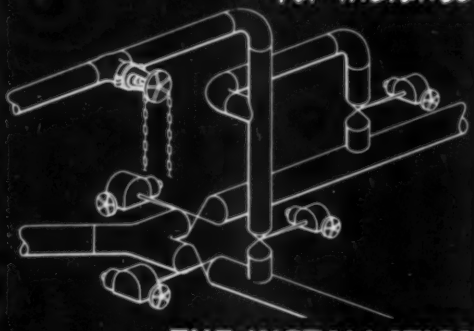
BABCOCK & WILCOX
THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

R-407

B&W REFRACTORIES PRODUCTS — B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick B&W Refractory Castables, Plastics and Mortars • OTHER B&W PRODUCTS—Stationary & Marine Boilers and Component Equipment . . . Chemical Recovery Units . . . Seamless & Welded Tubes . . . Pulverizers . . . Fuel Burning Equipment . . . Pressure Vessels . . . Alloy Castings

Can You Rate Your Valves This Well?...

on Main Steam Service for instance



THE INSTALLATION

VALVE SERVICE RATINGS

MAINTENANCE COST:	None to date
FEATURES:	Highly practical Pressure-Seal design
SUITABILITY:	Eliminates bonnet joint leakage
SERVICE LIFE:	Now more than 4 yrs.
PRICE:	In line for this modern design
AVAILABILITY:	Regular item in Crane line

Crane Pressure-Seal Gate Valve on 8-inch main steam lead to house turbine. Steam conditions: 850 psi at 900 Deg. F. Southwark Station, Philadelphia Electric Co.

THE HISTORY

This valve was installed on a trial basis in the station's last extension program. In service now more than 4 years, this 900-Pound Crane Pressure-Seal Bonnet Gate Valve has completely eliminated any need of bonnet joint maintenance. Under constant high pressure/high temperature conditions, it remains perfectly tight at bonnet and stem; needs no costly attention.

Never, says the customer, does this Crane valve stick at the disc, even though operated infrequently. Its operation is as smooth and positive today as when first installed. As a result of this performance, the customer is continuing to specify Pressure-Seal type valves.

THE VALVE

Universally recognized for simplified development of the modern pressure-seal bonnet principle, Crane Pressure-Seal Gate Valves combine many added refinements. For example, their highly compact, weight-saving design reduces erection costs; streamline body contouring saves insulating labor and material. See your Crane Catalog or Crane Representative for complete details on these valves—in gate, globe, angle, and stop-check patterns; in 600, 900, and 1500-Pound pressure classes.

The Complete Crane Line Meets All Valve Needs. That's Why More Crane Valves Are Used Than Any Other Make!

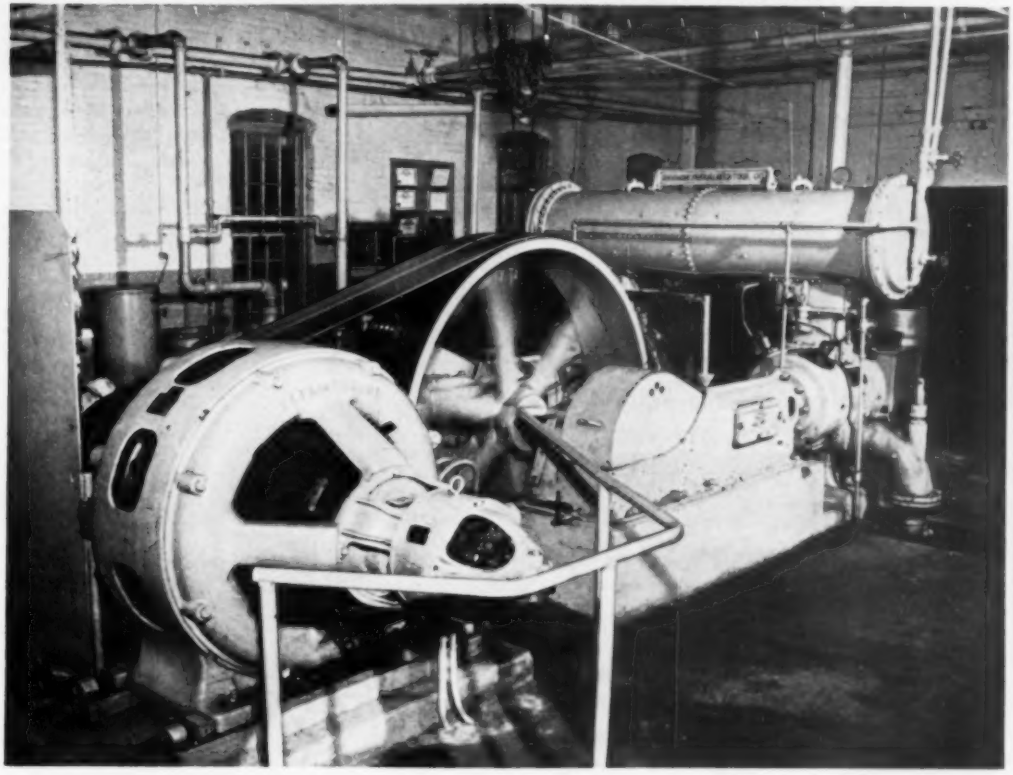
CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

"No Valve, Ring, or Bearing Service for Over 2 Years!"

Says the American Car and Foundry Company



The American Car and Foundry Company's huge plant at Huntington, West Virginia has been a user of Sinclair lubricants for over eighteen years. The results are of particular interest!

For example – the four compressors in the ACF plant are lubricated with Sinclair RUBILENE Medium. Proof of outstanding lubrication stamina is attested to by this service report: *"None of these compressors has required servicing of valves, rings, or bearings for over two years."*

Results speak volumes for this Sinclair Product. Why not investigate the advantages of RUBILENE Oils, available in *nine* viscosity grades? Contact your nearest Sinclair Representative or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N.Y.

SINCLAIR RUBILENES®
for low maintenance costs

ADJUSTABLE PIPE HANGERS AND SUPPORTS

for every piping requirement

NO. 4 OF A SERIES SHOWING THE GRINNELL LINE

BRACKETS, HOOKS, CLAMPS for attachment to walls, columns and beams

Light Welded Steel Bracket
Fig. 194
max. load: 750 lb.

Medium Welded Steel Bracket
Fig. 195, max. load: 1500 lb.
heavy welded steel bracket
Fig. 199, max. load: 3000 lb.

Side Beam Bracket
Fig. 202
load: 150 to 2300 lb.

Side Column Bracket
Fig. 203
load: 150 to 390 lb.

Cast Iron Bracket
Fig. 223
load: 610 lb.

Cantilever Bracket
Fig. 221
with angle iron ext.
Fig. 222

Single Hook
Fig. 168
½ to 3 IPS

One Hole Clamp
Fig. 126
⅜ to 4 IPS

FLANGES, CLIPS, HOOKS for attachment to the ceiling

Adj. Swinging Hanger Flange
Fig. 155, for ⅜ to ⅞ in. rod
Range only
Fig. 156, for ⅜ to 12 in. pipe

Swivel Hanger Flange
Fig. 154
for ⅜ to ⅞ in. rod

Pipe Hanger Flange
Fig. 153
for ⅜ to ⅞ in. rod

Ceiling Flange
Fig. 128
for ⅛ to ¾ IPS

Adj. Clip Base
Fig. 116
for ¾ to 2 in. pipe
⅜ in. rod size

Wrought Clip, Long
Fig. 263
short: fig. 262
½ to 4 in. pipe

Tin Clip
Fig. 231
¼ to 2 in.

U Hook
Fig. 205
¾ to 8 in. pipe

Call Your Local Grinnell Distributor or write for Hanger Catalog.

GRINNELL

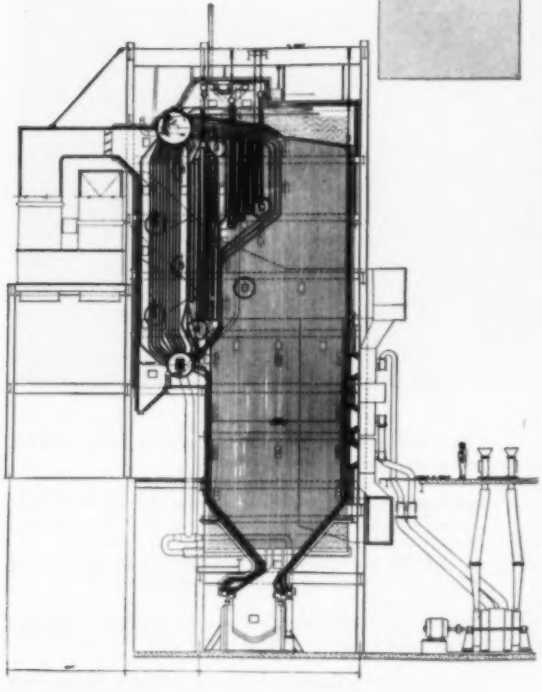
AMERICA'S #1 SUPPLIER* OF PIPE HANGERS AND SUPPORTS

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

Manufacturer of: pipe fittings • welding fittings • forged steel flanges • steel nipples • engineered pipe hangers and supports
Thermolier unit heaters • Grinnell-Saunders diaphragm valves • prefabricated piping • Grinnell automatic fire protection systems

VULCAN ALL-ELECTRIC, AUTOMATIC SEQUENTIAL SYSTEM on ALBRIGHT STATION'S OUTDOOR BOILERS

Operator at the panel needs only to push a button to start the Vulcan Automatic Sequential soot blowing. He can interrupt and select any one or more stations for repeat blowing or cut-out—or remote push button control may be used. No need to patrol the boiler, for each unit reports back to panel by indicating light.



Built at Albright, West Virginia, by Monongahela Power Company and The Potomac Edison Company, Albright Station will have its two new outdoor boilers cleaned by an all-electric Vulcan Automatic Sequential System. All-electric drive means cleaner, more dependable operation. There will be no danger of freezing in control-air lines to the outdoor blowers.

If you want effective, low-cost cleaning of your boilers—large or small, utility or industrial, power or process—depend on Vulcan. The oldest name in soot blowing will give you the latest word in results.

COPES-VULCAN DIVISION
CONTINENTAL FOUNDRY & MACHINE COMPANY
ERIE, PENNSYLVANIA

Capacity, each of 2 Boilers	770,000 lb per hr
Superheater Outlet Pressure	910 psi
Superheater Outlet Temperature	905 F
Fired with	Pulverized coal
Soot Blowing	Vulcan Automatic Sequential System with long retractables, wall blowers and controls for air-heater cleaners. Electric drive. Blowing medium: Steam.
Engineers	Sanderson & Porter

VULCAN Automatic Soot BLOWERS

● THE MUNICIPAL ELECTRIC PLANT

of MUSCATINE, IOWA

Knows the value of

Automatic Control

Republic automatic boiler control and instrument panels at Muscatine Municipal Electric Plant

● In 1941 the Municipal Electric Plant at Muscatine, Iowa, installed a modern 100,000 lb. per hr. steam generator. In 1948 a second boiler rated at 160,000 lb. per hr., 650 psi. was added.

In any steam electric generating plant, electric power rates and steam costs go hand-in-hand. Low steam cost however, is not the result of efficient boiler design alone. To realize all the operating advantages of these modern boilers, each was equipped with a Republic automatic combustion and feed water control system at the time of installation.

The installation of Republic automatic controls on your boiler or (boilers) will enable you to:—

SAVE FUEL by automatically maintaining highest combustion efficiency.

INCREASE STEAM OUTPUT by operating the boilers at test efficiency 24 hours a day, 7 days a week.

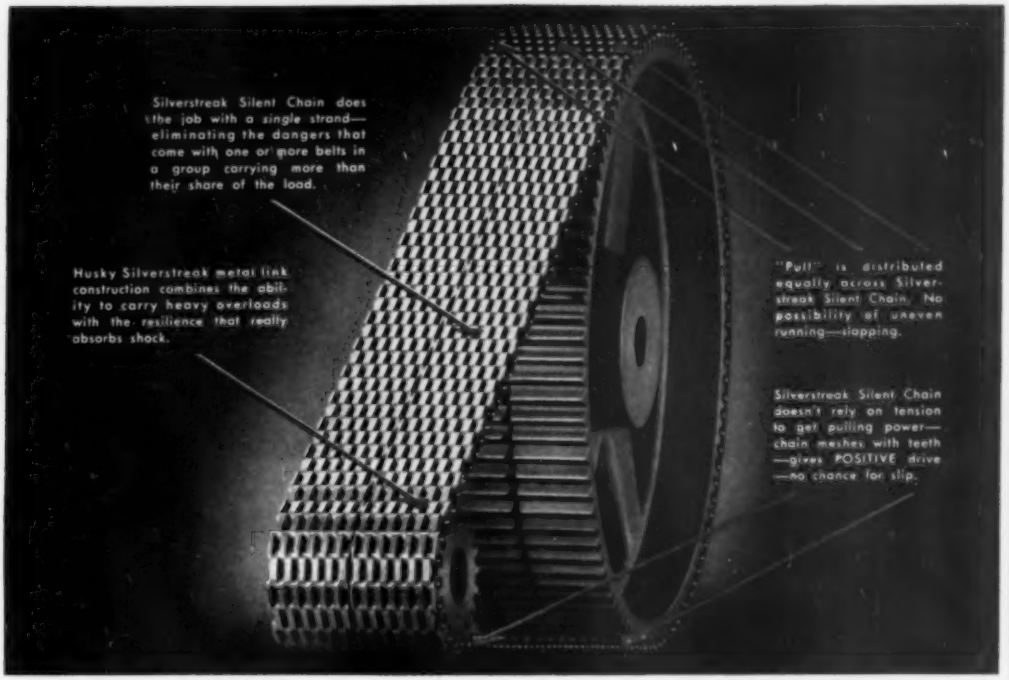
CONSERVE MANPOWER by automatically performing the many routine repetitive adjustments.

REDUCE OUTAGES by maintaining uniform operating conditions.

Find out about Republic control systems. One of our engineers will be glad to consult with you at any time. Write us today.

REPUBLIC FLOW METERS CO. ● 2240 DIVERSEY PARKWAY • CHICAGO 47, ILLINOIS

Here's the proved way to transmit high hp at high speeds...



Link-Belt Silverstreak Silent Chain drives are slip-proof...slap-proof...shock-proof

ON thousands of applications . . . under all types of operating conditions—Link-Belt Silverstreak Silent Chain Drives have proved their effectiveness and durability. High horsepowers and high speeds are delivered with the same trouble-free efficiency (over 98 per cent) as on less demanding loads. There's a power-transmission engineer in the Link-Belt office near you.

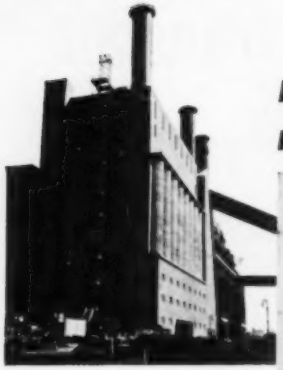
LINK-BELT

SILVERSTREAK SILENT CHAIN DRIVES

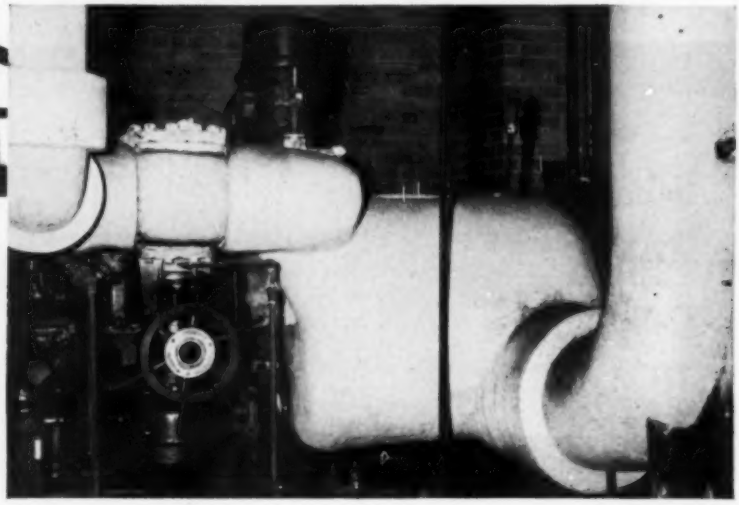
12,528-A

LINK-BELT COMPANY: Atlanta, Dallas 1, New Orleans 12, St. Louis 1, Charlotte 2, N. C., Baltimore 18, Birmingham 3, Houston 1, Jacksonville 2.

As it has since 1940, a touch of the control button brings exact press speeds at the New York Herald Tribune. In those 12 years, there has been no replacement required on the two 100 hp Silverstreak Silent Chain Drives that power this press at chain speeds up to 5664 fpm.



For this new addition to their New York City power plant at East River and 14th Street . . .



(Above) View of recently completed annex to Consolidated Edison's power plant . . . another link in their gigantic expansion program. **(Right)** Close-up of J-M 85% Magnesia Insulation on boiler feed lines. It was expertly installed by the Asbestos Construction Company, Inc., an outstanding J-M Insulation Contractor.

CON EDISON SPECIFIES J-M 85% MAGNESIA PIPE INSULATION FOR MAXIMUM FUEL SAVINGS

Like all materials that went into the new power plant addition of New York's leading gas and electric supplier . . . the pipe insulation had to be the *best*. That's why Consolidated Edison Co. specified J-M 85% Magnesia . . . industry's No. 1 insulation for many decades and *still* the leader in its class.

J-M 85% Magnesia is the leading insulation on the market for temperatures up to 600F. It is bonded with asbestos fibers. This rugged insulation will not distort regardless of the length of time it stays in service. J-M 85% Magnesia fits snug and stays put. Heat savings, therefore, remain constant for the life of the equipment on which this insulation is applied.

For temperatures over 600F, J-M 85% Magnesia is used in combination with Superex*, a J-M insulation for service to 1900F. This double-layer construction, known as Superex Combination, eliminates through joints and protects the jacket against scorching. It also utilizes the higher heat resistance of Superex next to the hot surface, and the greater insulating value of J-M 85% Magnesia for the outer layer.

*Reg. U.S. Pat. Off.

Experience has proved that all insulations must be properly installed to pay maximum dividends. That's why Johns-Manville offers industry the services of experienced insulation engineers and installation contractors who have made a career of solving complex insulation problems. From coast to coast, these engineers and the contractor's highly skilled mechanics stand ready to combine their talents and give you an insulation job that will more than pay off your initial investment with maximum fuel savings through the years.

When you face your next insulating problem . . . remember that Johns-Manville is "Insulation Headquarters." Consult your near-by J-M Insulation Contractor . . . or write direct to Johns-Manville, Box 60, New York 16, New York. In Canada, write 199 Bay Street, Toronto 1, Ontario.

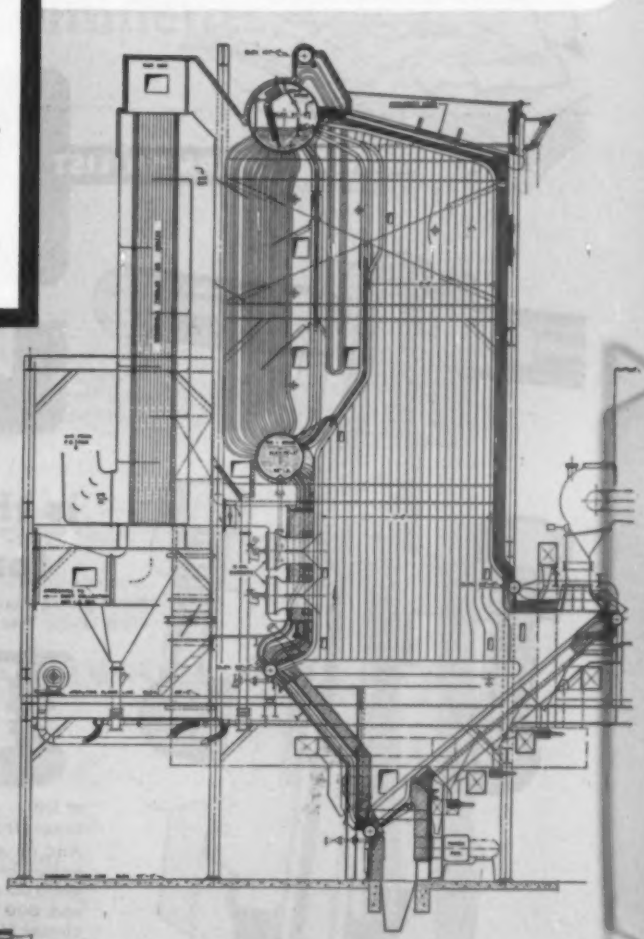
Skilled Applicators on the team of a J-M Insulation Contractor applying J-M 85% Magnesia to pipelines. Located throughout the nation, these contractors have had years of experience handling all types of installations. They know J-M 85% Magnesia and other J-M insulations as *quality* products, and take pride in applying them properly. Result: an insulation job that pays dividends through the years in maximum fuel savings.

Johns-Manville *FIRST IN* INSULATION

MATERIALS • ENGINEERING • APPLICATION

STEAM GENERATING UNITS *designed to meet the needs of* INDUSTRY

NEW SPRINGFIELD UNIT FOR PULP AND PAPER MILL



SPRINGFIELD is building steam generating units for virtually every branch of industry: for PAPER MILLS... for TRACTOR PLANTS... for makers of FARM IMPLEMENTS...for AUTOMOTIVE PLANTS...GLASS FACTORIES...special boilers for CHEMICAL MANUFACTURERS. Shown at the right is a modern 80,000 lb. combination wood and oil fired Springfield unit installed in the power house at the pulp and paper mill of Publishers' Paper Co., Oregon City, Oregon.

Springfield specializes in the fabrication and erection of steam generating units designed to meet the user's particular requirements: ANY SIZE...ANY PRESSURE...ANY TEMPERATURE AND FOR ANY FUEL. Springfield is organized to apply the same engineering skill to all contracts, large or small. We will be glad to submit a proposal covering your requirements.

Check with Your Consulting Engineer on Modernization and New Plant Projects

Location: Publishers' Paper Co., Oregon City, Ore.
Consulting Engineer: H. W. Beecher, Seattle, Wash.

This unit is designed for 250 psig and operates at 200 psig with 500°F. total steam temperature at superheater outlet. In addition to superheater, it is equipped with a Springfield tubular air heater and a completely water cooled furnace, including a specially designed water cooled grate for burning wood in such a manner that the hearth tubes serve as water walls when burning oil only.

The unit is designed to deliver 80,000 lbs. per hour continuously and 110,000 lbs. per hour for two-hour peak when fired with oil only. When fired by wood and oil, it will develop 25,000 lbs. per hour on wood and 55,000 lbs. on oil firing.

SPRINGFIELD BOILER CO.

1957 E. Capitol Ave., Springfield, Illinois, U. S. A.

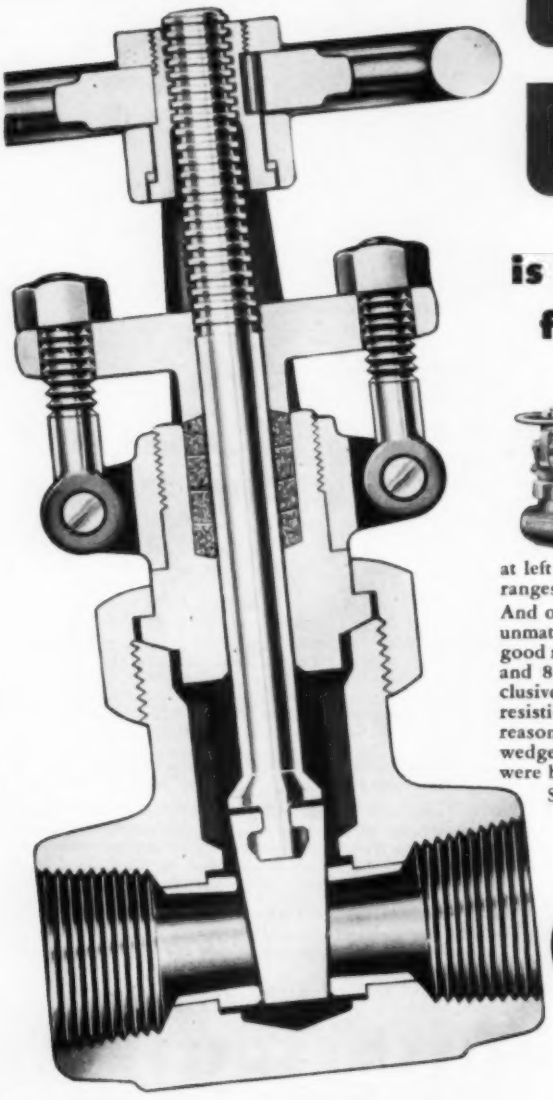
Worldwide Sales and Service

See Our Catalog in SWEET'S

BENT TUBE BOILERS • STRAIGHT TUBE BOILERS • SUPERHEATERS • DESUPERHEATERS • AIR HEATERS
ECONOMIZERS • WATERWALLS • PACKAGE BOILERS • COMPLETE STEAM GENERATING UNITS

You don't have to look it up...

CHAPMAN LIST 960



is the RIGHT NUMBER for any number of different jobs

No other small valve has as big a field of application as this Chapman List 960 Forged Steel Gate Valve. You can get it in sizes from ¼" to 2", with joints either gasketed or metal-to-metal . . . and in 2 types: Rising stem with yoke, as shown at left . . . or rising stem with inside screw. Pressure ranges from 2,000 lbs. at 100°F, to 380 lbs. at 1,000°F. And on *any* job, Chapman's List 960 shows the same unmatched ability to take it . . . and stay with it. One good reason is that hard faced Stainless steel seat rings and 800 Brinell hardening of gate faces by the exclusive Malcomizing Process, provide maximum wear-resisting and non-galling properties. And still another reason is that changes in design have made stem and wedge gate connections *50% stronger* than they ever were before.

So if you want the biggest savings you ever got from a small valve, *specify Chapman List 960.*

THE

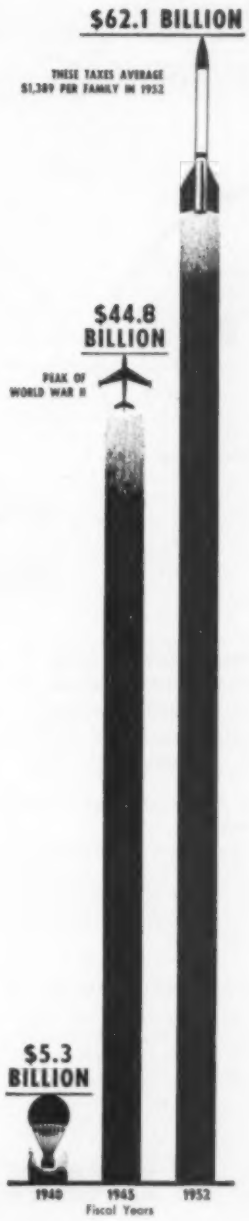
CHAPMAN

VALVE MFG. CO.

INDIAN ORCHARD, MASS.

Timely Comments

FEDERAL TAXES HEAD FOR THE STRATOSPHERE



THIS GRAPH showing how federal taxes have jumped 1,072 per cent in the past 12 years caused some breath-taking when it appeared in a recent issue of *Washington Report*, weekly publication of the Chamber of Commerce of the United States.

The Chamber emphasizes that the federal tax load for 1952 amounts to $1,389 per American family, as compared with $1,196 for 1945, at the peak of World War II tax collections, and as compared with $152 per family as recently as 1940.

In some cases, taxes exceed the value of products. But more important are the exorbitant taxes levied against all people on milk, eggs, and other daily necessities of life.

Here are a few startling tax facts issued by the National Association of Manufacturers.

Cigarettes		**Milk**	
Tax	.12	Tax	.09
Value	.09	Value	.14
Price	.21	Price	.23
Bread		**Gasoline**	
Tax	.05	Tax	.14
Value	.09	Value	.12
Price	.14	Price	.26
Beef		**Hosiery**	
Tax	.32	Tax	.66
Value	.58	Value	.99
Price	.90	Price	1.65
Flour		**Soap**	
Tax	.03½	Tax	.05
Value	.07½	Value	.09
Price	.11	Price	.14
Electricity		**Travel Fare**	
Tax	1.38	Tax	7.52
Value	2.57	Value	12.48
Price	3.95	Price	20.00

Industry Speaks

SOUTHERN POWER AND INDUSTRY

Industrial and Marketing Revolutions

WHO SPARKED THE SOUTH?

A recent issue of TIDE, the newsmagazine of sales and advertising, featured a cover story on the South: a market report on the huge changes made in the past year and still taking place. TIDE asked "Who Sparked the South?" and gave much credit to the *Southern Association of Science and Industry*.

AN INCREASINGLY vibrant spot for progressive manufacturers and marketers for a half a decade now, the South is still making news in such volume and at such a pace that last year's reports and records already are broken. The South is undergoing two revolutions at once: still in the middle of its industrial revolution, it has the concurrent impact and vitality of the marketing revolution, too. Just as the latter is sweeping the country, it is changing the face and future of business in the South.

What Has Been Happening?

Keynotes to the South's revitalization are diversification and increasing industrialization. The bulk of this bubbling activity has occurred since World War II, although the first fires blazed because of war production. Of the 26 billion dollars expended by government and private industry for wartime construction, the South got $4.5 billion, thereby neatly doubling the area's industrial plant capacity.

Between 1939 and 1947 the South added 16,000 new establishments. For every million dollars spent on a brand new plant, $15 million went to spruce up existing industries. Last year alone, 146 new traffic-producing plants opened along the Southern Railway's right of way.

The manufacturing advances have been in all directions—both to strengthen established industries like textiles, basic chemicals, wood products and tobacco, and to branch into new ones—petrochemicals, electrical goods, metal products, synthetic textiles. Of all these the chemical industry is the prodigy: last year more than half the nation's new chemical plants (valued at $600 million) located south of the Mason-Dixon line.

Why The March Southward?

There are many reasons. The area abounds in natural resources—water petroleum, natural gas, minerals and forests. The Labor pool is extensive: population growth in the South outstrips the rest of the country and increased mechanization of farms yearly releases hundreds of workers to industry. Another important and controversial factor is the favorable tax structures and the states' financing of plants.

Who Sparked the South?

Just before the war a spunky newcomer, the Southern Association of Science and Industry, started doing something about all these attractions. A non-profit, non political group of university scientists and key industrial, business and financial firms, it feverishly set about promoting scientific research in the South, with an eye to intensive regional development.

From 1941 until 1949, SASI's work was carried on entirely by its officers and committees. Then, with activity at a record high, SASI opened an office in Atlanta and brought in H. McKinley Conway, Jr., as full time director. An aggressive, progressive outfit, SASI collects, analyzes and distributes all kinds of salient developmental data on the Southern states. On the side, SASI sparks regional conferences, feeds the national press reams of information and even makes annual awards to outstanding servants of the South.

More Than Ever Before

TIDE's market report on the South outlines some of the physical aspects of the area's industrial revolution. It is emphasized that the implications of this growth for advertisers and marketers are obvious. There's more money in Dixie today than ever before—and there will be much more tomorrow.

Who's Who in the S.A.S.I.

S.A.S.I. Officers for 1952-53 are: President: *A. B. Paterson*, Chairman of the Board, New Orleans Public Service, Inc.; Regional Vice President *Dr. A. P. Black*, Head, Dept. of Chemistry, University of Florida, and founder, Black Laboratories; Regional Vice President *Dr. Frank J. Soday*, Director of Research, The Chemstrand Corporation, Decatur, Alabama; and Secretary *Dr. George D. Palmer*, Professor of Chemistry, University of Alabama; and Treasurer *A. G. Maxwell*, Vice Pres., Citizens and Southern National Bank, Atlanta, Georgia.

H. McKinley Conway, Jr., is Executive Director of the Southern Association of Science and Industry with offices at 5009 Peachtree Rd., Atlanta, Georgia.

Southern Pine Lumber Company Continues

PLANT MODERNIZATION

By CHARLES A. LAWLER
Partner, H. E. Bovay, Jr., Consulting Engineers, Houston, Texas

Southern Pine Lumber Company's Operation at Diboll, Texas

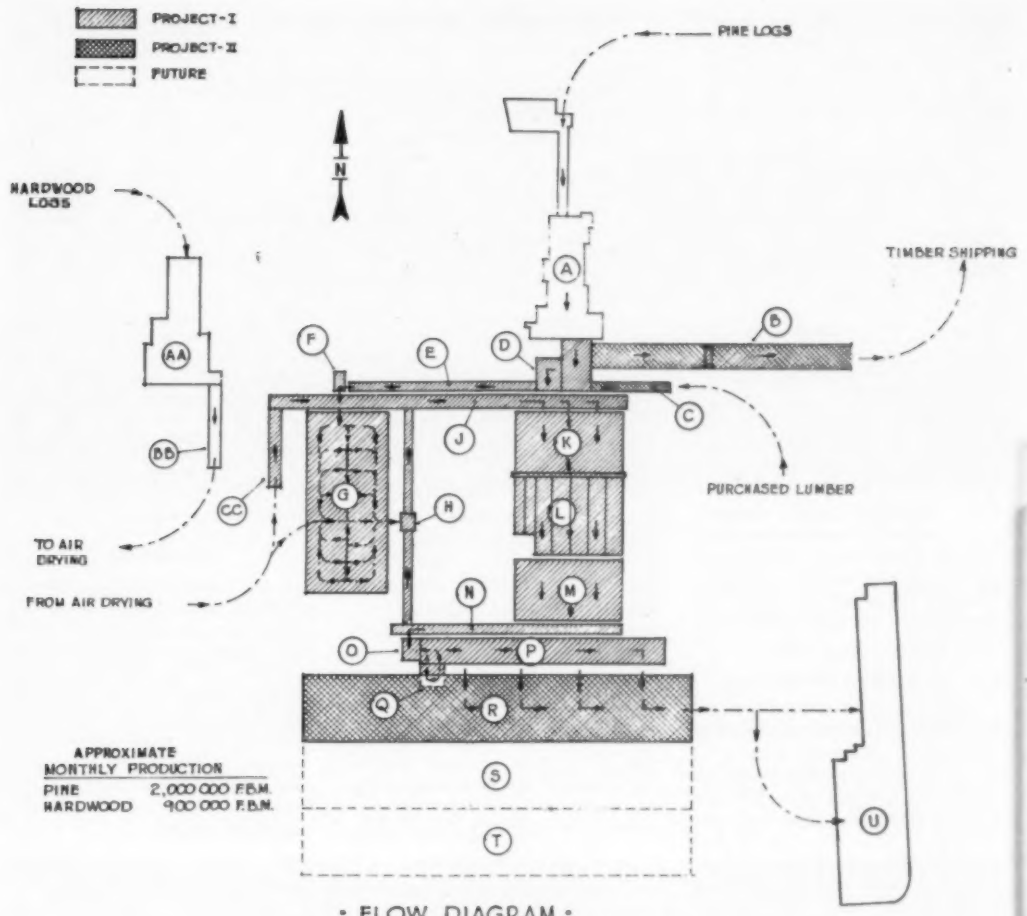
Ten ton overhead bridge crane is the "work horse" in this new modern 100 x 600 ft rough lumber storage building. Southern Pine cuts materials handling manpower requirements and protects product in process.

THE Southern Pine Lumber Company of Diboll, Texas, began operations in its new and spacious rough lumber storage building in May, 1952, culminating Project II of its overall modernization program. The long range plan for modernization was conceived and worked out several years ago through joint efforts of the Southern Pine Lumber Company and H. E. Bovay, Jr., Consulting Engineers, and will result in a completely new plant. The overall plan embraced the entire plant from log handling through finished lumber shipment plus steam and power generation facilities.

Because of need for replacement of dry kilns and an attractive payout on extensive manpower savings, Project I consisted of building all new and modern handling and processing equipment and facilities between the sawmill and the then existing rough storage building. The initial construction program was completed during the period April, 1949, to October, 1950, and was reported in the November, 1951, issue of SP&I. Since its completion Southern Pine Lumber Company has already attained the position of leadership for modernization in the South.

Project II

Predicated by Southern Pine's desire to protect its product while in process and at the same time save manpower Project II was undertaken. Old lumber storage buildings, which were in poor physical condition and an invitation to fire, were retired from service and replaced by a new 100 x



• FLOW DIAGRAM •
• SOUTHERN PINE LUMBER CO. •
DIBOLL, TEXAS

A—Sawmill No. 1 (pine)
B—Timber Dock Craneway*
C—Purchased Green Lumber Conveyor*
D—Trimmer Saw
E—Green Conveyor
F—Edge Sorter Feed Station
G—Edge Sorter
H—Stacker
J—Green Transfer
K—Green Storage Tracks
L—Dry Kilns
M—Cooling Shed & Dry Storage Tracks
N—Dry Transfer
O—Unstacker
P—Dry Sorter
Q—Remanufacturing Plant
R—Rough Storage Bldg.*
S—Planing Mill (Future)
T—Finished Storage & Shipping Bldg.
U—Planing Mill & Shipping
AA—Sawmill No. 2 (Hardwood)
BB—Green Chain (Hardwood)
CC—Manual Hardwood Kiln Stock
*—Project III

600 ft rough storage building with overhead bridge crane for handling lumber from dry sorting to storage and thence to the planing mill for finishing. A layout and flow diagram of the existing and new portions of the plant helps to visualize how the rough storage building fits into the overall scheme and indicates the future program of modernization in planing and shipping facilities.

The new storage building, with over 60,000 sq ft of floor area and a truss height of 50 ft, provides 10,000,000 board feet of storage capacity in orderly 4 x 4 ft packages of remanufactured rough kiln dried lumber sorted for grade, length, width and thickness between the dry sorter and the planing mill.

The building is arranged closely adjacent to the dry sorter building (a part of Project I) so that lumber packages formed by pullers at the sorting chain will now be picked up and taken to storage or to planer by the 100 ft span overhead bridge crane equipped with remote cab operated lumber grapple. Crane rails are 41 ft above the floor of the building, allowing 4 x 4 ft packages of lumber to be stacked seven-high for storage. The craneman, who rides the cab of the fast bridge crane, with the assistance of one floorman for placing of bunks on

formed packages, will now be able through mechanization to do the work once done by eighteen men who transported and stacked lumber in the old rough storage buildings.

For the time being, until a future project includes the rebuilding of the planing mill and shipping building adjacent to the rough storage building, lift trucks will be employed to transport lumber packages set down by the overhead crane from storage, over to the existing planing mill for finishing. In the future planing mill next to the rough storage building, floor chains leading to planing machines will eliminate need of lift trucks for planer send-in.

The new building is constructed entirely of concrete and steel with structural steel framing, roof covering of asphalt protected v-beam steel sheets, corrugated galvanized iron siding, and amply designed reinforced concrete foundations to resist hurricane wind forces.

Building Design

A total of 730 tons of structural steel was utilized in the building framework. A special feature of the structural framing design allowed the saving of about 100 tons of structural steel and over 1000 cu yds of concrete. Bolted steel A-frame wind bracing was utilized on the side away from the dry sorter building; the size and weight of column and truss members was considerably reduced. It is easily seen that the conditions for design to withstand hurricane winds are more severe with the present single rough storage building than they will be in the future when two additional 100 ft bays for planing mill and shipping building are added alongside.

The floor consists of iron-ore gravel placed on well tamped and drained sub-grade. Another type of flooring may be put in later, but the gravel floor is considered adequate until more operating experience is obtained.

Because the rough storage building is designed for one-shift daytime operation, daylighting, provided by means of skylights installed in the roofing system, allowed appreciable savings in lighting costs and reduced requirements of artificial lighting system to the minimum required for the benefit of night watchmen. Skylights consist of appropriately spaced panels of flat translucent wired glass designed to provide a minimum of 10 foot-candles light intensity at floor level when outside sky brightness is approximately 1000 foot candles (equivalent to a dark overcast day in December). The resulting light condition in the building is satisfactory on such a day and excellent for working conditions on bright sunshiny days.

Ventilation

A natural ventilation system is provided by means of a 12 in. continuous gravity type roof-ridge ventilator which takes advantage of the 80 foot ridge height of the building to ventilate the building properly by natural updraft. The ridge ventilator is equipped with remotely controllable manual operators to close off entirely during the cold winter months if desired.

How modern materials handling can pay off . . .

In Southern Pine Lumber Company operations at Diboll, Texas, a modern rough storage building has replaced older buildings in poor physical condition. New unit has a 10 ton, 100 ft span, overhead bridge crane, which moves all the lumber to and from storage and to the planer for finishing.

Crane can travel the full length of the 600 ft building in one minute and trolley supporting the operaor's cab and hoisting mechanism travels back and forth across the building at a speed of 250 fpm. Lumber grapple, controlled by craneman in the cab, will rotate a full 360 degrees, pick up a lumber package, carry it to any spot and set it down in any position desired.

Crane rails are 41 ft above the floor of the building, allowing 4 x 4 ft packages of lumber to be stacked seven-high for storage. The craneman, who rides the cab of the fast bridge crane, with the assistance of one floor-man for placing of bunks on formed packages, is now able through mechanization to do the work once done by eighteen men who transported and stacked lumber in the old rough storage building.

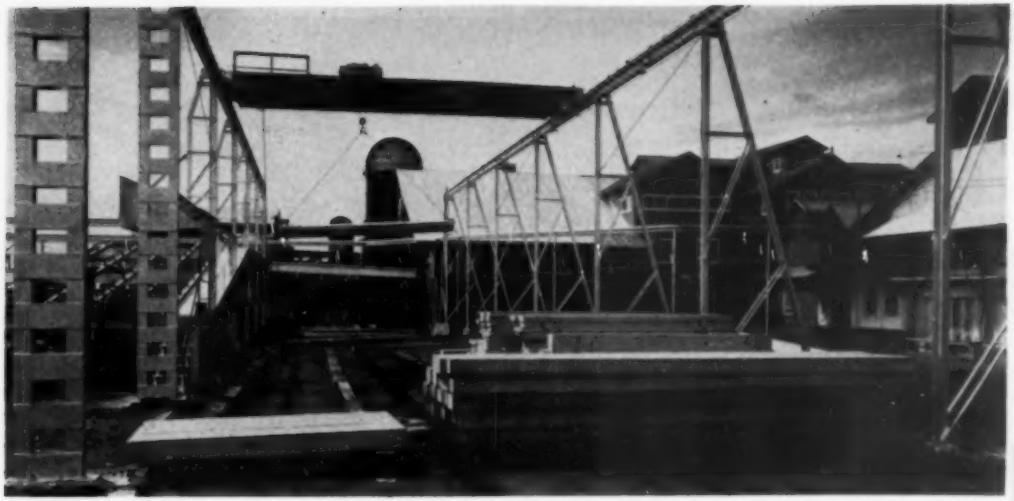
Rough storage building foundation data . . .

Prior to the design of foundations, soil borings were made to determine general conditions at the site. By means of laboratory tests on soil samples, the strength and physical characteristics of the soil for supporting imposed building and crane loads were determined.

The subsurface investigations revealed that the building would be supported on bentonitic clay which would be expected to swell and shrink appreciably with seasonal variations in soil moisture content. This factor influenced the design of the entire structural framework of the building.

Design was made to allow individual bents to be free to move upward and downward with seasonal variations in soil moisture without the severe racking of the building that would have resulted in a completely rigid longitudinal framing. A footing depth was chosen that allowed use of a soil bearing value of 4,000 lb/sq ft, about one-third more than is normally utilized without such engineering knowledge of the conditions of the underlying strata.

The direction and magnitude of movement in the supporting foundations will be measured and recorded by means of surveying instruments during the first eighteen months to two years of building operation so that if sufficient movement is found to cause undue stresses to be set up in the building framework, remedial measures such as shimming under column base plates may be taken before damage is done to the building frame or craneway.



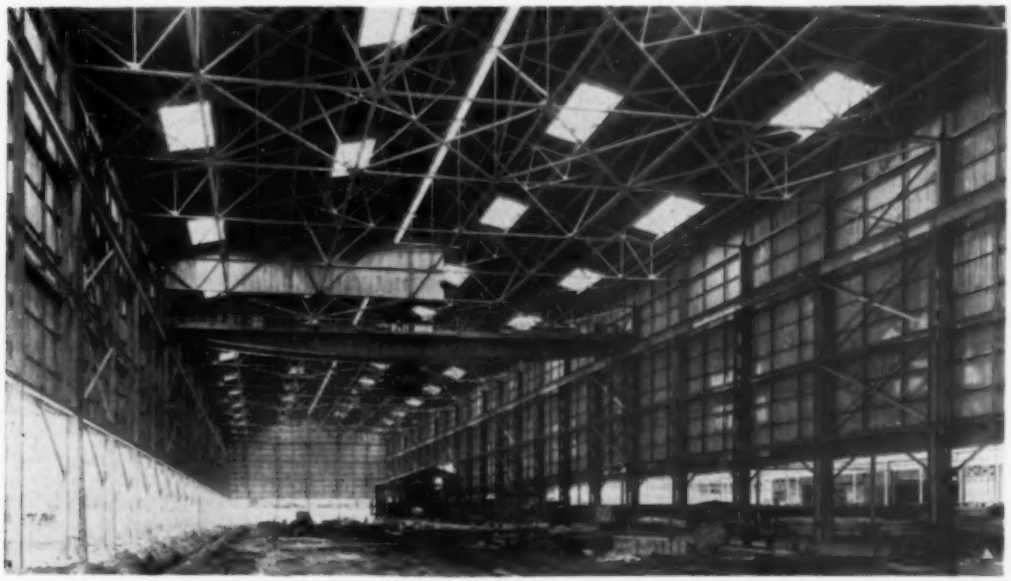
Newly completed 3 ton, P & H (Harnischfeger Corporation) overhead bridge crane for handling of green timbers near the existing pine sawmill. Crane spans 40 ft center to center of runway rails and is controlled by operator on the ground. Pine sawmill is in the right background.

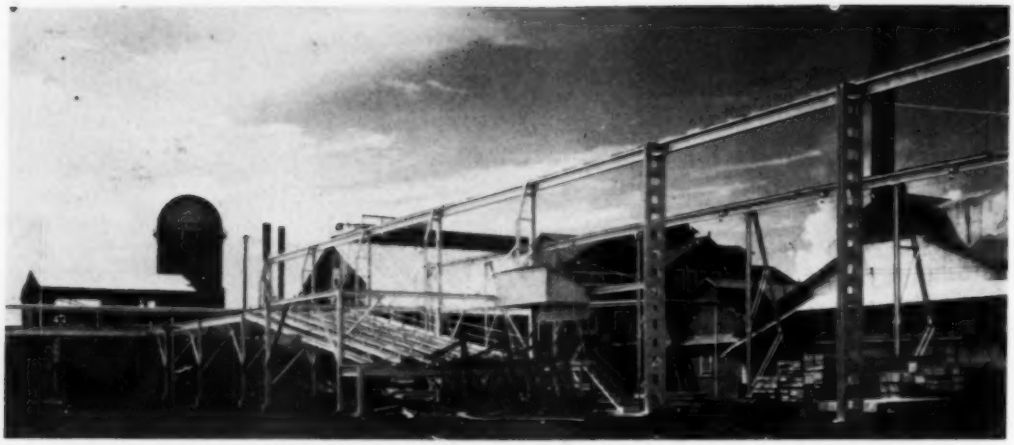
The electrical system for the service to the storage building and crane was provided by extension to the new electrical distribution equipment installed with allowances for future projects along with the construction of Project I. Features of the electrical service to the building include low level illumination provided by the staggered rows of 300 watt incandescent fixtures at crane level for safety purposes and 480 volts, 3 phase service to three "figure 8" copper wire conductors for supplying power to the crane.

Fire Protection

Excellent fire protection and corresponding low fire insurance rate results from the provision of

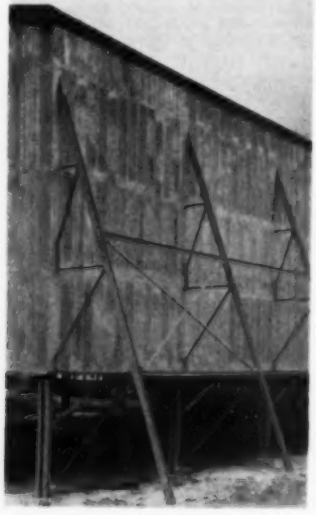
General interior view of the 100 x 600 ft rough lumber storage building. The 10 ton, P & H (Harnischfeger Corporation) overhead crane spans 100 ft between runway rails. Note the H. H. Robertson Company sky lights and the partially complete fire protection draft curtain. Existing dry sorter conveyor and building is alongside at the right and dry lumber manufacturing plant built as part of Project I, is seen in the center background extending partially into the rough storage building.





The purchased lumber tilting breakdown hoist and conveyor make possible the easy and efficient handling of packaged rough lumber produced by small mill operators. A lift truck is used to unload the lumber trucks and place packages of lumber on the tilting hoist arms. This rough green lumber is introduced ahead of the Project I trimmer saw; after trimming it is then conveyed and sorted in the edge sorters and handled along with lumber produced in Southern Pine's sawmill.

an extension to the existing plant fire loop water mains along the length of the building just inside the south column line and the provision of a dry pipe sprinkler system. The fire main provided to supply this system is designed so that it can be covered with removable floor panels if future permanent paving is installed in the storage building. Again looking toward the future, the sprinkler system was designed to supply half the requirements of the future planer building without alterations or changes in pipe size. In addition, it will provide symmetrical overall sprinkler system for the rough storage planer and shipping building using a minimum of scarce steel pipe.



Close-up of the southwest corner of the rough lumber storage building. Building height is 55 ft from floor line to eave. Specially designed A-frame wind braces along south column line will be re-erected to the south of the future planing and shipping buildings.

Crane Operation

Certainly the most important feature and the heart of the mechanization involved in the project is the 100 foot span overhead bridge crane for lumber handling weighing over 100,000 pounds and having fast speed and operating features of the most modern type to be found anywhere. The crane will be the real work horse in this project to move all the lumber to and from storage and to planer. The crane is capable of traveling the full length of the 600 foot building in one minute and the trolley supporting operator's cab and hoisting mechanism travels back and forth across the building on the crane bridge girders at a speed of 250 feet per minute. The lumber grapple remotely controlled by the craneman in the cab, will rotate a full 360 degrees, pick up a lumber package, carry the package to any designated spot and set it down under perfect control in any position desired. Hoisting and lowering speed is 85 feet per minute. Bridge travel, trolley movement, hoisting and grapple rotation can all be done at the same time. The crane is equipped with full magnetic controls and has an open type operator's cage, providing good visibility and safety of operation: The crane is also equipped with two braking systems, one magnetic, the other mechanical to assure safety while operating at the highest speeds.

Also a part of Project II was the newly installed timber crane and craneway adjacent to the sawmill, plus the installation of conveyors, breakdown hoist, and floor chains for the receipt and easy handling of purchased sawn lumber to introduce ahead of Project I trimmer saw. The timber craneway extends from the trimmer saw at the sawmill 250 feet to the east and covers an area sufficient for the storage of 150-200,000 feet of heavy timbers; the crane also spans a truck loading roadway and rail siding. Timbers can now be easily handled from the sawmill timber roll conveyor to sorting and storage, and to shipping by truck or rail by means of the electrically powered, three-motor, 40 foot span bridge crane. This portion of Project II was designed

by *R. C. Musslewhite*, Engineer for Southern Pine Lumber Company, with a small amount of assistance by H. E. Bovay, Jr., Consulting Engineers.

Future Expansion

Completion of Project II marks a great milestone in the eventual complete modernization of the lumber manufacturing plant at Diboll, Texas. The project adds its own support to the well-founded premise that long range overall planning is an essential factor in the life and proper growth of any manufacturing plant. Future projects will be covered by subsequent articles as they are developed.

Concurrently with this program of modernization of the lumber mill, Southern Pine Lumber Company is now extending its wood treating facilities to meet the demand of treated wood products from its modern Wood Treating Plant completed in March, 1951. Plans and specifications for this addition to the treating plant, prepared by the consulting engineers, include doubling the length of the pentachlorophenol pressure treating cylinder and increasing capacity of the working tanks to increase production of "penta" treated poles, timbers and lumber.

Services

Preliminary planning, estimates, economic feasibility, and overall design features, were worked out jointly by the staff of Southern Pine Lumber Company and H. E. Bovay, Jr., Consulting Engineers.

Mr. G. E. Glover worked in the capacity of Project Engineer for Southern Pine Lumber Company's Project II, supervising the design layout, specifications, and drafting of plans for the project for H. E. Bovay, Jr., Consulting Engineers. Preliminary planning was worked out with close cooperation between Southern Pine personnel and included an inspection trip to many of the modern mills in Oregon and Washington utilizing overhead crane buildings for storage and shipping of products. Many features of design noted on this inspection were included and improved upon in the design of Southern Pine's building. The trip was made by *Nolan B. Hall*, power plant superintendent and electrical engineer for Southern Pine Lumber Company, and the writer. Part of preliminary planning was a scale model of the floor plan. Wood blocks of scale size representing all length, width, thickness and grade separations to be handled and stored in the building were utilized to determine best arrangement for storage and easy inventory, and accurate determination of storage volume capacity. Building of the model and experiments performed were performed under the supervision of *Joseph C. Denman*, assistant superintendent of Southern Pine Lumber Company's mill.

PROJECT II BRIEF

Detailed design plans and specifications for the project, including construction supervision and inspection were provided by H. E. Bovay, Jr., Consulting Engineer, Houston, Texas.

Soil borings and foundation investigations by Greer & McClelland, Consulting Foundation Engineers, Houston, Texas, acting as special consultants to H. E. Bovay, Jr.

Structural steel fabrication and erection by Mosher Steel Company, Houston, Texas.

Roofing, skylights and ridge ventilator manufactured by H. H. Robertson Company, furnished and installed by Jamar-Olman Company, Houston, Texas.

Sprinkler system installed by the Grinnell Company, Houston, Texas.

Cranes—both the timber handling crane and the rough storage building lumber crane are P & H cranes manufactured by the Harnischfeger Corporation.

The timber growing industry has reached a sustained yield basis through modern forestry and timber farming methods. It is only natural that progressive lumber manufacturers, seeing a more stable source of supply and a more stable economic condition in their industry, should look to the future and plan the modernization of old mills and the construction of new mills on a permanent basis.

As little as 25 years ago, the yearly national cut was four times the yearly growth and mills built then were not built with such an eye to permanence. Today, the picture has changed radically with growth already up to 98 per cent of yearly cut, and mill operators are beginning to take advantage of the situation to perpetuate their companies.

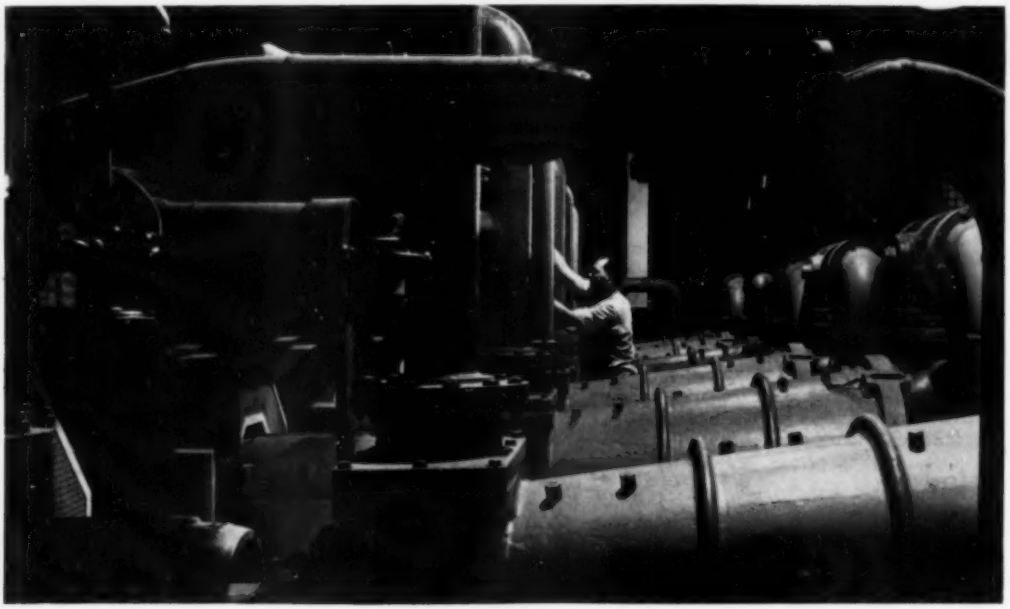
Typical is the modernization program at Southern Pine Lumber Company of Diboll, Texas. The plant is now one of the most up-to-date and streamlined operations to be found in the industry. The results are a greater ease of production, improved working conditions and worker morale, increased efficiency, safer working conditions, and a greater production volume of higher grade Southern yellow pine and hardwood lumber.

NO STEAM PLANT

in Oklahoma's First Paper Mill

Baled waste paper is unloaded from railroad cars by Towmotor fork lift trucks, weighed and stored under covered storage. Electric conveyors to each of three disintegrating units — Hydrapulpers — are also fed by fork trucks, which make light work of handling the 1600 lb bales.

In these six Jordans fibers undergo abrasion, rubbing and cutting that divides and separates them. Stock is then pumped to screens where any remaining foreign matter is removed. It is then piped to forming vats at the "wet" end of the paper machine.



Electric power, water, steam, and compressed air are piped into National Gypsum Company's "push-button" Pryor, Oklahoma, paper mill.

DURING World War II, the government built the Oklahoma Ordnance Works, a 51 million dollar smokeless powder plant near the Grand River, eight miles south of Pryor, Oklahoma. As tremendous amounts of steam and hot water were needed to wash the chemicals, a steam-electric plant was constructed. Six turbine generators are capable of producing 90,000 kw.

After the war the Grand River Dam Authority advertised that it would be willing to sell steam, electricity, water and compressed air to any industry which would locate in northeastern Oklahoma. The National Gypsum Company became interested and secured 49 acres of land near the steam-electric plant as the site for its new paper mill. The paper mill was designed and constructed in 10 months.

The mill makes a heavy eight-layer sheet for lining three of National Gypsum Company's Gold Bond Products — gypsum wallboard, lath and exterior sheathing. The mill supplies the company's three midwestern gypsum board plants located at Fort Dodge, Iowa; Medicine Lodge, Kansas; and Rotan, Texas.

Utilities

Over 5 miles of steel, copper, concrete and lead pipes carry water, steam, and compressed air to the various operating sections of the mill. Primary power is 13,200 volts, 3 phase, 60 cycle. Secondary power is 460 volts. Water is filtered, treated and chlorinated and delivered to the plant through a 12 in. line at 75 lb pressure; compressed air delivered through a 4 in. overhead line; and steam through approximately one third of a mile of overhead 12 in. pipe at 150 lb pressure. Condensate is not returned but is used with fresh or clarified water for the felt showers.

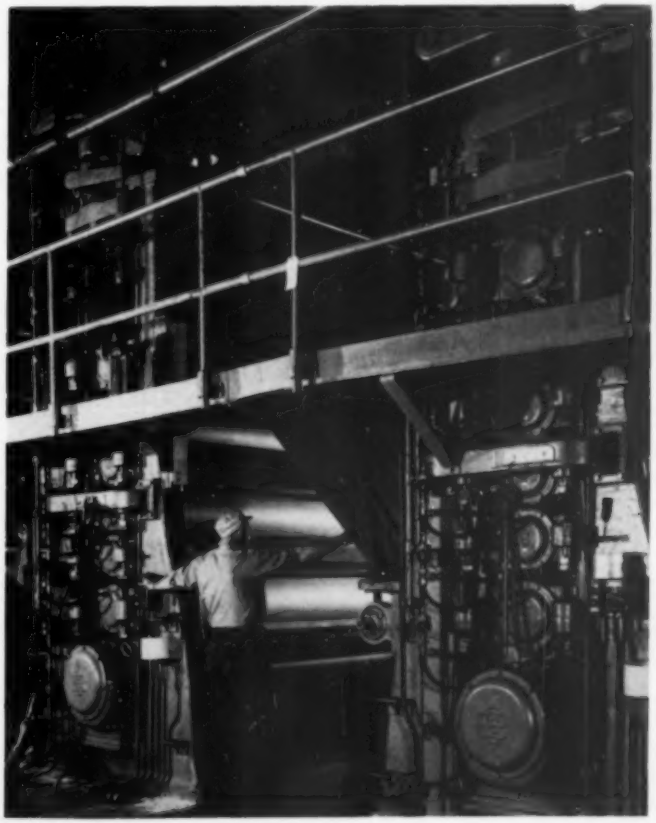
Process Data

Raw materials, including newspapers, mixed papers, corrugated boxes, kraft corrugated cuttings and wood pulp, are known as "furnish." Arriving at the mill's receiving dock by rail and motor freight, bales are unloaded with Towmotor fork trucks.

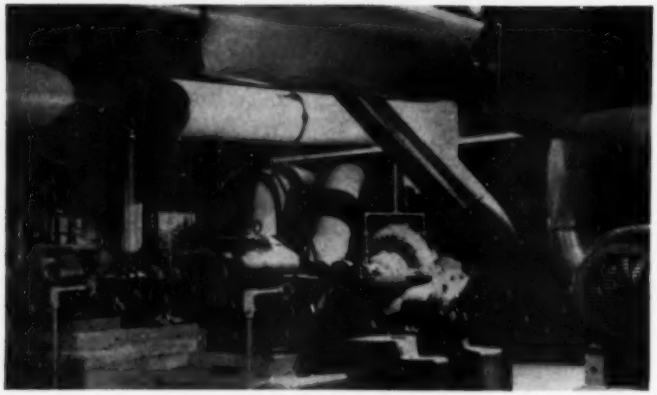
Raw materials are carefully proportioned as they are placed on moving conveyors which feed three big disintegrating units—Hydrapulpers operating on the same principle as a malted milk mixer. Each machine prepares a different type of furnish. The Hydrapulper separates the fibers so they can be matted into a new sheet. Cooking is not necessary because the waste paper has already gone through that operation and consists primarily of cellulose fibers.

Paper fibers then pass through other cleaning units and after being thickened by removing some of the water, they are pumped to one of eight glazed tile dump chests in the basement where they are kept agitated. All chests have either recording or controlling level instruments.

Six jordans with closed piping



These two calender stacks impart the desired finish to the sheet. A Bowser automatic pressure oiling system provides bearing lubrication in these units.



Here are some of the pumps that circulate paper stock through miles of pipes in various parts of the mill.

system handle all stock, filler stock having a consistency controller and liner stocks being made batch-wise. Jordans are equipped with automatic plug control. Stock (fibers and water) is pumped to screens where any remaining foreign matter is removed. It is then piped to the forming vats at the "wet" end of the paper machine.

Paper machine is driven by a Terry steam turbine connected to a line shaft through cone pulleys and Black-Clawson spiral bevel gear drives. The wet end of the machine is operated by d-c motors, which obtain current from a d-c generator at the end of the lineshaft. Centrally located control panels provide finger-tip control.

The paper machine has 8 cylinders, called moulds, which are covered with a fine wire cloth. Each revolves, partially submerged, in a vat of fiber stock. The first mould picks up a layer of fiber and transfers it to an endless moving belt of felt. As it travels

(*Continued on page 79*)

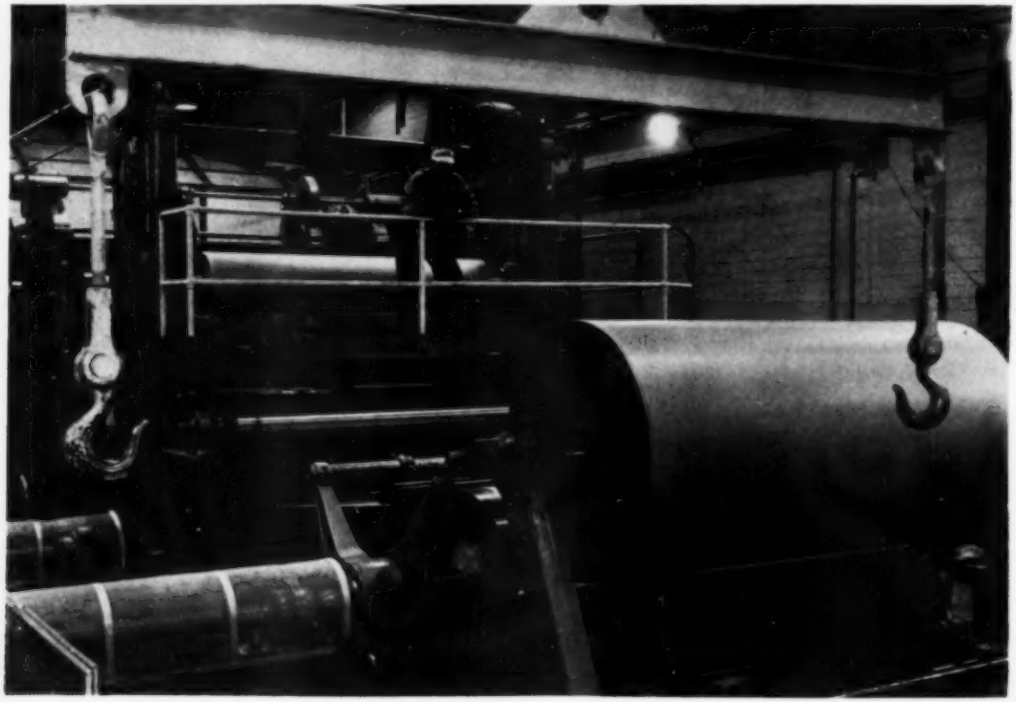
Who's Who at National Gypsum

National Gypsum Company operates with a Production Manager for paper, **L. L. Hank**, and a Production Engineer, **W. J. Sprau**, both located at the Buffalo, New York, Executive Offices. These men supervise and coordinate the activities of the company's four paper mills.

At Pryor, Oklahoma, responsibility for the plant and its operation is vested in **Paul J. Dumas**, Plant Manager. The Mill Superintendent is **Eugene E. Nose**; Maintenance Supervisor is **Robert W. Harris**; and Office Manager, **R. N. Schnabel**.

Plant layout and process flow was conceived by L. L. Hank. Detail design was developed by **W. J. Sprau**. Plant engineering, construction and erection was in charge of **S. D. Skinner**, National's Chief Engineer. General contractors were the **Manhattan Construction Company** of Muskogee, Oklahoma. **The Black Clawson Company**, Hamilton, Ohio, was the major equipment supplier.

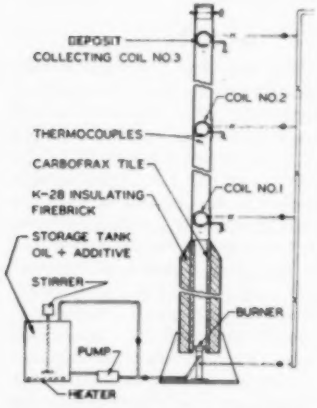
After passing through calender rolls paper is wound on a continuous speed reel into 5 ton rolls. Overhead crane moves reel to rewinder where it is cut to specified widths and wound into large rolls for shipment.



Progress Report on Fuel Oil Additives to RELIEVE BOILER SLAGGING

Ash deposits from fuel oil are modified to make them more readily removable. Test program conducted by Babcock & Wilcox at the Inglis station of Florida Power Corporation.

SIGNIFICANT results in relieving the problem of troublesome deposits on boiler tubes from the firing of residual fuel oil have been accomplished in both laboratory and field operations according to The Babcock & Wilcox Company. Certain grades of oil such as Bunker C have long been recognized as having the disadvantage of containing ash contents, which, upon combustion, result in depositing on boiler heat transfer surfaces, particularly superheater tubes, a hard residue not readily removable by air or water lancing. Frequent interruptions in operation were required for thorough cleaning.



This pilot furnace and mixing device for testing promising additives under simulated operating conditions was constructed at the B&W Research Center. Compressed air supply line is at the top right. Oil and additive are mixed in a storage tank over a heater and then pumped into the burner of a small furnace. The flue gas goes up the stack, leaving deposits on the three coils. In this small research furnace the gases act as they will in a regular large boiler furnace, forming a deposit on whatever tubing they contact.

Work Started in 1949

This situation has been aggravated with the recent trend toward larger boilers with higher steam temperatures and since an ash free fuel oil of this grade is not economically feasible, Babcock & Wilcox attacked the problem from the angle of controlling the characteristics of the ash deposits. As long ago as 1949, in its Research & Development Center in Alliance, Ohio, the B&W specialists began seeking a solution. The company investigators decided that a modification of the fuel ash deposits to make them more readily removable was the best approach.

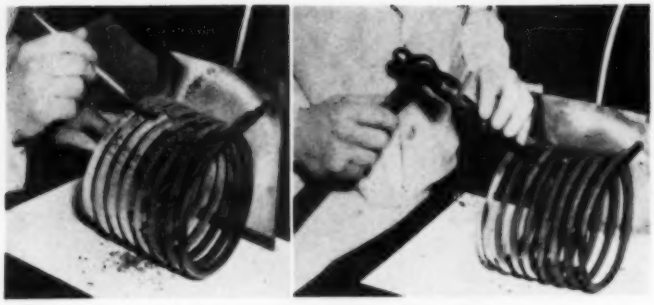
Deposits Studied

Troublesome superheater deposits were found to be characterized by low-melting constituents and laboratory work was carried out on selected materials that, when intimately mixed with the oil ash, would raise its melting point so that upon deposition on heating surface it would be dry and thus more readily removable by the customary means on an operating unit. The effect on fusing temperatures by intimately mixing synthetic oil ash with various additive compounds was studied using ASTM coal ash fusibility determinations. The first fusion cones were made from an actual oil ash obtained by burning a quantity of a typical troublesome oil until the ash was left as a residue. Since this was a tedious process and an expensive way to obtain oil ash, all subsequent samples were compounded by mixing the individual constituents in proper proportion to obtain the same chemical composition as present in the oil ash. Comparable fusing temperatures were obtained when using this synthetic ash. A number of materials were added individually to the synthetic ash and it was found that some mixtures had higher fusing temperatures than the oil ash alone.

Pilot Furnace Tests

The next step was to set up a pilot furnace for testing promising additives under simulated operating conditions. The equipment consisted essentially of a small furnace in which the fuel-additive mixture was burned and a series of three air-cooled coils upon which the resulting deposits from the products of combustion were collected. The coils were placed at different levels in the stack to study the effect of various temperature zones on deposit formation on the cooled metal tubes.

During the pilot tests the additive was mixed with the fuel prior to combustion, as it was believed that the effectiveness of the additive would thereby be increased due to its more even dispersion through the fuel and its more intimate contact with the oil ash throughout the combustion proc-



Additives in the form of finely divided materials suspended in the fuel oil and organic compounds of the soap type (soluble or miscible with oil) were tried in the pilot-plant tests in various weight ratios to the ash in the oil. Alumina, magnesium oxide, and calcium oxide were found to be the most promising of the additives tested in producing a powdery deposit (left). Note how easily it can be brushed from the coils. In a big boiler it could be blown off, and out. This contrasts with the hard, glassy, fused material (right) that was formed when these additives were not used. Note that it must be chipped off. In a big boiler this would mean shutting down until tube soaking and time consuming, difficult, hand-cleaning is accomplished.

ess. For this reason a mixing device was incorporated in the test arrangement.

To accelerate the tests and increase the rate of deposit formation, diesel fuel oil to which a synthetic ash was added was used to produce deposits similar to those obtained on commercial units.

Additives in the form of finely divided materials suspended in the fuel and organic compounds of the soap type (soluble or miscible with oil) were tried in the pilot-plant tests in various weight ratios to the ash in the oil. Alumina, magnesium oxide and calcium oxide were found to be the most promising of the additives tested.

Aluminum stearate proved to be very effective, but economic considerations make its practical use doubtful. Finely divided alumina is commercially available at a cost of about 3.25 cents per pound in bulk and, when suspended in the fuel in a ratio of one pound of additive to one pound of ash solids, it appeared to be sufficiently practical and economically feasible to justify large scale trial.

This apparatus for checking dew points of gases was developed at the B&W Research Center and has been used at the Inglis and Higgins stations of the Florida Power Corporation and at a Tampa Electric Company station. A low dewpoint means that the water vapor in a fuel gas condenses at a lower temperature. Additives seem to lower the dewpoint and a lower dewpoint means that the ingredients which would form slag, form less.

Field Tests

About a year ago arrangements were made for a test program on a commercial-size unit under actual operating conditions at the Inglis station of the Florida Power Corporation.

The unit is an FH boiler having a capacity of 300,000 lb/hr steam at 900 psi and 910 F total steam temperature, equipped with an inverted-loop superheater. It carries a practically constant 24-hour load of 275,000 lb/hr. It has a tube-to-tube furnace, fired with six Y-jet burners. The oil burned is a No. 6 fuel oil. An analysis of a sample of this oil showed 3.0 per cent sulfur and an average ash content of approximately .15 per cent. Noticeable quantities of water in the oil were not uncommon. The oil is delivered to the station by barge and each shipment is sampled and checked for ash content.

This boiler has been in operation since 1947 and has been normally removed from service twice each year for cleaning. During operating periods, in addition to the use of sootblowers every eight hours, including three retractable units in the superheater cavity, it has been necessary to water-lance the superheater and air-lance and water-wash the airheater. To do this, a cleaning gang was employed three or four nights a week. During shut-down, the cleaning process involved soaking the cold boiler tubes with water for two or three days to loosen the deposits and considerable hand work was required to remove the hard clinging portions. The cleaning process required several days to complete.

Test With Alumina

The results of the alumina tests bore out the Research Center findings that the deposits in the superheater region were changed from a dense hard slag to a relatively soft ash and indicated that it should be possible to keep the unit on the line indefinitely if the furnace walls, screen tubes, and superheater tubes were lanced with air at 225 psi about once a week. It was found advisable to clean the airheater after this lancing to remove the material blown there from the boiler superheater and economizer tubes. The use of sootblowers has not been necessary; however, boiler water has been used on the retractable sootblowers approximately once every three weeks to supplement the air-lancing. The installation at Inglis normally burns slightly less than 20,000 pounds of oil per hour for the 275,000 lb/hr load. Using alumina in an amount equivalent to the quantity of ash in the oil,

the cost of additive has been approximately $1.00 per hour or $750 per month.

It has been found that the addition of alumina to the oil has increased atomizer wear to the point where it is necessary to renew standard sprayer plates every thirty days. Special sprayer plates of hardened steel have been developed which have alleviated this wear problem to some extent.

Dolomite More Economical

Upon completion of the tests with alumina, a program was initiated using dolomite as the additive. This material is available locally at Inglis and is obtainable for $12.00 or less per ton which is equivalent to $.18 per hour or $130 per month at the rating referred to above. It is a calcium-magnesium carbonate and in the form used is obtained from calcining kiln stack gases. Its fineness is 100 per cent through 325 mesh screen.

The results obtained at Inglis with dolomite confirmed laboratory findings. With the dolomite, however, more of the fine powdery material was deposited in the first pass of the superheater. That section of the superheater extending into the second gas pass was found to be clean after a two-month operating period with dolomite, and the third gas pass, consisting only of saturated surface, was also clean. Experience at Inglis shows that the wear rate of sprayer plates continued strong. However, at another plant the wear rate of sprayer plates when dolomite was used has been slight.

From an ash standpoint, there is every indication that the unit can be kept clean for an indefinite period with the use of a 200 psi air lance every five to seven days. However, it is necessary that lance doors be provided so that all the rows of tubes are accessible. It is necessary to have the air jet discharge close to the ash that is being removed.

Lower Dew Point

In addition to raising the fusing temperatures of ash there are indications that the additives contribute another significant advantage in lowering the dew point of flue gases. The effect of dolomite on airheater corrosion is not yet fully known; however, the major constituent in the dolomite additive ash is CaSO4, so that probably a much smaller amount of free SO3 is present in the gases passing through the airheater. A suitable apparatus for checking dew points of gases indicated that there may be a difference between dew point temperatures when firing the same oil with and without additives. When firing a 2.75 per cent sulfur fuel, a dew point temperature of 150 F was recorded while using additives. Without additives, and using the same oil, dew point temperatures from 250-275 F were recorded.

A difference was also noted in the type of the deposit collected on the dew point apparatus probe. Without additives, the deposit was a dark brown, tenaciously clinging, "greasy to wipe" material which did not crumble. With additives, the deposit was dirty gray in color, "dry to wipe," and a crumbling material.

Procedure and Equipment

The procedure and equipment worked out with the Florida Power Company proves a good example of a typical installation. The additive is mixed, batch-wise, in heated fuel oil which is kept agitated. This is fed in measured quantities to the fuel oil ahead of the burner. At Inglis, where the firing rate is 2300 gallons per hour, 200 gallons (at 200°) of oil is withdrawn to a mixing tank every four hours, and 92 pounds of additive is added. A motor-driven stirrer maintains constant agitation and a reciprocating pump, adjusted to a feed rate of 50 gallons per hour, pumps the slurry into the oil line on the downstream side of the burner control and regulating valves. This proportion works out to approximately 0.1% of dolomite in the fuel.

A mixing tee is provided in the additive loop of the main oil stream to intensify the mixing action. In the piping arrangement the fresh oil meets the slurry "head on" and both streams must make several 90° turns before reaching the oil burners, thus providing more turbulence and mixing.

The distribution of additive to each burner position serves as a check on the quality of the mixing accomplished. Individual samples of treated oil are taken from each burner line to be analyzed for their additive content.

FINDINGS SUMMARIZED

Satisfactory results in relieving the problem of the deposits on boiler tubes from the firing of residual fuel oil have been accomplished in both laboratory and field operations by The Babcock & Wilcox Company. Test programs have been conducted at the Inglis and Higgins stations of the Florida Power Corporation and at a Tampa Electric Company station.

Additives in the form of finely divided materials suspended in the fuel oil and organic compounds of the soap type were tried in pilot-plant tests in various weight ratios to the ash in the oil. Alumina, magnesium oxide, and calcium oxide were found to be the most promising. Alumina and dolomite were tried in field tests. These tests indicated that a real saving in the amount of labor required to keep a unit operably clean and operating efficiently with present day oil fuel. In addition, the corrosive quality of the gases from the stack is greatly reduced and the nuisance from flyash particles is not as great.

The Babcock & Wilcox Company has applied for United States patent protection on this development. Any such patents obtained will be licensed by the Company to industry on a royalty-free basis. However, the Company would appreciate hearing from users as to their experience with this development, particularly on boilers, so that such information can be correlated for the benefit of all users.

No Steam Plant in Oklahoma Paper Mill

(*Starts on page* 74)

along to the other moulds, the felt picks up an additional web of fiber from each of them. The eight-ply, laminated sheet, containing about 7 tons of water for every ton of paper, then passes through a series of presses and suction rolls.

Now well consolidated, the sheet enters the dryer section with its 100 steam heated rolls, each weighing 2 tons. Heat and air evaporate water from the paper at a rate of 55 gallons a minute. Dried paper passes through calender rolls which act as huge ironers, imparting the desired finish to the sheet. It is then wound on a reel into rolls, each weighing 5 tons. The paper is then taken to the rewinder where it is cut to specified widths and wound into large rolls for shipment.

Training and Communications

emphasized at 33rd Annual Session of the Southern Industrial Relations Conference

MORE than a thousand foremen, superintendents, and other representatives of industrial management met July 16-19 in the Blue Ridge Assembly in the North Carolina mountains to listen to twelve prominent authorities on various phases of industrial relations and to discuss among themselves the problem brought before them during the past year.

At this thirty-third annual session of the Southern Industrial Relations Conference, two aspects of industrial relations soon appeared as the most important to the audience—training and communication. While there is nothing new about the topics, the interest in them is something new to this part of the country. One speaker after another emphasized supervisory training as being one of the keys to successful industrial relations. Such men as Milton Mumblow, of General Motors and Daniel Rochford, of Standard Oil Company

Top Executives Meet in Asheville, N. C.

Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Virginia, told how his company was able to set their record of industrial harmony over a long period of years.

Top executives of Southern industry met in Asheville, N. C., July 16, the day before the Southern Industrial Relations Conference in Blue Ridge, N. C., just 14 miles east. Max Kuniansky, Lynchburg Foundry Company; Dr. Leo Wolman, Professor of Economics, Columbia University; and Charles W. L. Foreman, United Parcel Service, were the speakers at the full day Conference.

Kuniansky said that his company had been very successful in using college graduates in supervisory positions following an 18 months' training course to teach them all phases of the business. Each year Lynchburg Foundry Company selects a number of students for these training courses, trying not to pick too many from any one college.

He also pointed out that his company had been most successful in relations with unions. He attributed their success to the education of supervisors on the line in the handling of labor grievances.

When asked how his company competed with others for labor when labor is scarce, Mr. Kuniansky stated that his policy was not to hire skilled workers from outside but to make use of an apprentice training system and only fill skilled jobs from within.

At the luncheon session, Dr. Wolman, of Columbia, gave his predictions of what is ahead for us in industry both from the short and the long range point of view. He saw very active markets ahead for the rest of this year with increasing sales and a rising economy. On the other hand, long range prospects do not seem too bright. He pointed to the increasing cost of government, the completion of much of the nation's required plant expansion and modernization, and the growth of labor unions with industry-wide and nation-wide organization. These factors, according to Dr. Wolman, indicate that the coming years will not be so propitious for the healthy growth of business.

1—**Gulf Oil Corporation** had a large group of their personnel and supervisory staff present. Front row: **D. G. Linn**; **F. D. Humphery**; **Fred Selby** of New Orleans; and **M. G. Roan**, Atlanta; Back row: **D. J. Shanahan**, **Jas. T. Lawless**, **E. L. McMillen**, **J. S. Purnell**, and **J. A. Wilson** of Houston.

2—**Alabama Power Company** had the largest delegation from any one company. Front row: **E. E. Glass**, Selma; **E. E. Dean**, Reform; **H. Hollis**, Enterprise; **J. T. Nettles**, Birmingham; **L. A. Achimon**, Tallassee; **T. M. Hand**, Atmore; and **W. A. Manry**, Mobile. Back row: **D. L. Ogburn**, Anniston; **W. E. Barrett**, Montevallo; **T. W. Thrash**, Birmingham; **G. O. Strachan**, Mobile; **D. B. Keeler**, Chickasaw; and **J. O. Henkel**, Birmingham.

3—On the lawn at Blue Ridge between sessions: **George Clough** and **Charles Eyler**, American Thread Co., Bristol, Tennessee; **R. B. Fuller**, International Mineral & Chemical Corp., Bartow, Florida; and **L. D. Locklin**, Georgia Power Company, Atlanta, Georgia.

4—In the Robert E. Lee Hall just before a conference session—**Harold M. Bryant**, South Carolina Gas & Electric Co., Columbia, S. C.; **Verne Babbitt**, Consolidated Textile Co., Lynchburg, Virginia; and **P. S. Keen**, National Carbon Co., Charlotte, N. C.

5—**H. Gordon Smith**, U. S. Rubber Co.; **Macon Miller**, Fielderest Mills; and **Charles R. Younts**, Plantation Pipe Line Co.

6—**Jack A. Wilson** (left) National Foremens Institute, Skyland, N. C., talks with three textile mill men—**B. E. McCardle** and **E. M. Johns** of Avondale Mills, and **Guy Glenn**, Orr Mills, Anderson, S. C.

(N. J.), caught the interest of their audience in discussions of communications—the means used to carry the word from management down to the rank and file and then back up again to management.

If this meeting is, again this year, as it has been in the past, a preview of aims and activity in Southern Industrial relations, this will be a year in which every level of industrial personnel will be part of the show.

Another great truth demonstrated clearly at these meetings is that Southern management, while strongly opposed to unions in general, is every year learning how to live with them and prosper. There is no longer the great fear of unions so prevalent ten years ago.

PROCESS IMPROVEMENT

at R. G. LeTourneau, Longview, Texas

typical methods engineering case history reported by

PAUL BROADSTONE, Production Engineering Supervisor,
R. G. LeTourneau, Inc., Longview, Texas

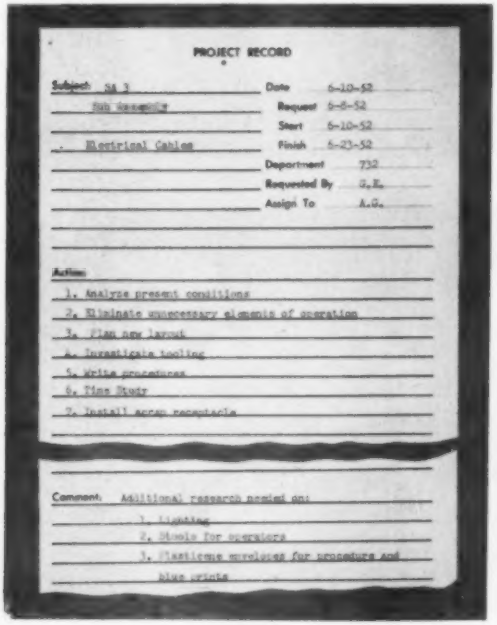
THE majority of industrial plants throughout the South and Southwest are prone to emphasize the spectacular or dramatic achievements in methods improvement and overlook or underestimate the possibilities of the obvious.

We of R. G. LeTourneau at Longview, Texas, have adopted Kipling's attitude and use his "serving men" in our process analysis of the routine operations and functions.

"I keep six honest serving men.
They taught me all I know.
Their names are What and Why and When
and How and Where and Who."

METHODS engineering is a full time job devoid of extraordinary amounts of glamor, and a well organized mode of operation produces more constant and desirable results than a plan which glorifies a few amazing results. Application of this principle to the following methods engineer-

FIGURE 1 (below) and FIGURE 2 (right) served as work sheets in this typical R. G. LeTourneau methods engineering case history.



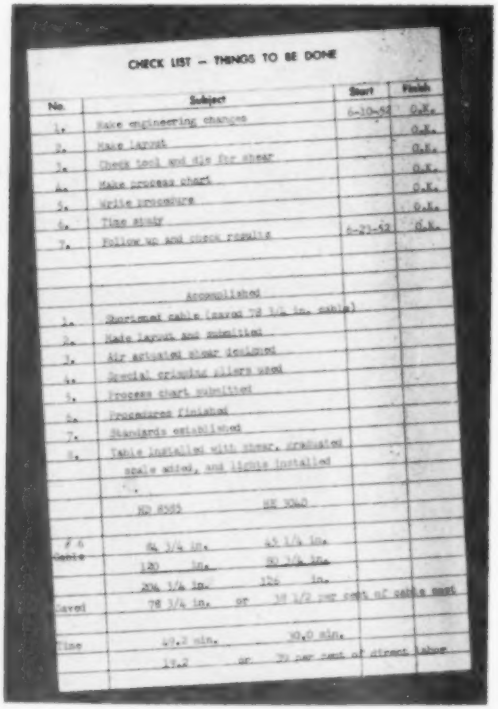
PROJECT RECORD

Subject: SA 3
Sub Assembly
Electrical Cables

Date 6-10-52
Request 6-8-52
Start 6-10-52
Finish 6-23-52
Department 732
Requested By J.E.
Assign To A.G.

Action:
1. Analyze present conditions
2. Eliminate unnecessary elements of operation
3. Plan new layout
4. Investigate tooling
5. Write procedures
6. Time Study
7. Install scrap receptacle

Comment: Additional research needed on:
1. Lighting
2. Stools for operators
3. Plastisome envelopes for procedure and blue prints



CHECK LIST — THINGS TO BE DONE

No.	Subject	Start	Finish
1.	Make engineering changes	6-10-52	6-?-52
2.	Make layout		O.K.
3.	Check tool and die for shear		O.K.
4.	Make process chart		O.K.
5.	Write procedure		O.K.
6.	Time study		O.K.
7.	Follow up and check results	6-21-52	O.K.
	Accomplished		
1.	Shortened cable (saved 78 1/4 in. cable)		
2.	Made layout and submitted		
3.	Air actuated shear designed		
4.	Special gripping pliers used		
5.	Process chart submitted		
6.	Procedures finished		
7.	Standards established		
8.	Table installed with shear, graduated scale wired, and lights installed		
	NO MORE	NO MORE	
Cable	84 3/4 in.	45 1/4 in.	
	120 in.	80 1/4 in.	
	204 1/4 in.	126 in.	
Saved	78 3/4 in. or	38 1/2 per cent of cable used	
Time	49.2 min.	30.0 min.	
	19.2 or	39 per cent of direct labor	

ing case history saved us 39½ per cent of our direct labor and 38½ per cent of our material cost.

Here is the way it happened. A request was made by the foreman of the sub-assembly department for an engineering study. A Project Number SA 3 was assigned and preliminary information noted on the Project Record (Figure 1). A Check List of Things to be Done (Figure 2) was stapled to the Project Record and on June 10, 1952, the project was assigned.

At this point the "six honest serving men" posed these questions. **What** is the mode of operation, its layout, and its resulting production? **Why** aren't we getting the required production? **When** could we expect better results? **How** could we improve the layout and methods and still reduce cost? **Where** could we locate the various necessary apparatus, raw material, and equipment? **Who** could do the job and be held responsible?

Using these questions as guides, potential answers were compiled in "Things to be Done"—Figure 2. In this compilation, every feature of the job was subjected to the What, Why, When, How, Where and Who routine and considered as potential material for process improvement.

The first item on the check list was "Make Engineering Change." This item was necessitated by the fact that an altered design in the main assembly would make it possible to shorten the cables. However, this feature of design had been inadvertently overlooked. There were 12 such cables involved but we shall use only one as an example.

Cable number HD 8585-2 (check Figure 3) was a generator to main switch 2 conductor cable for double scraper hookup. Its material requirement was one piece of 6 conductor cable 120 in. long and one 6 conductor cable 84¾ in. long. After analysis this number

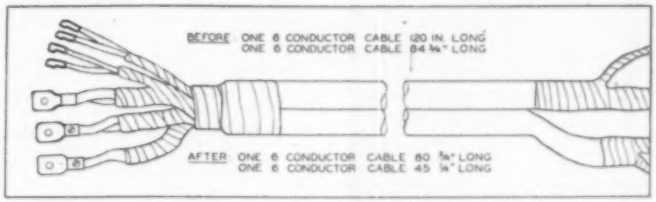


FIGURE 3—partial view of the 2 conductor cable for a double scraper hookup. Note how engineering change saved 78¾ in. of cable, or 38½ per cent of the total cable previously used.

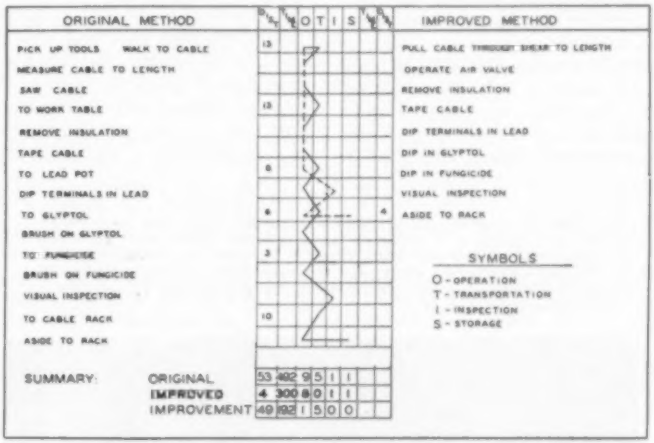
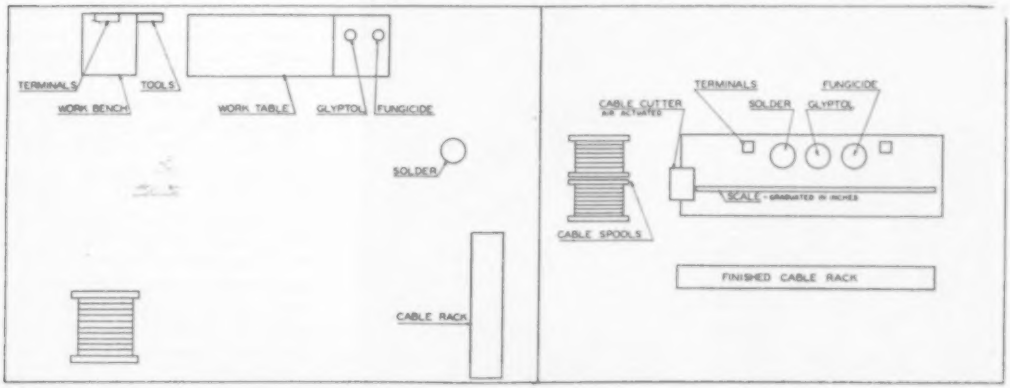


FIGURE 6—Process analysis sheet utilized on conductor cable.

FIGURE 4 (left) shows the former layout of the cable sub-assembly department. Revised layout, designed for better production, is shown at the right in FIGURE 5.



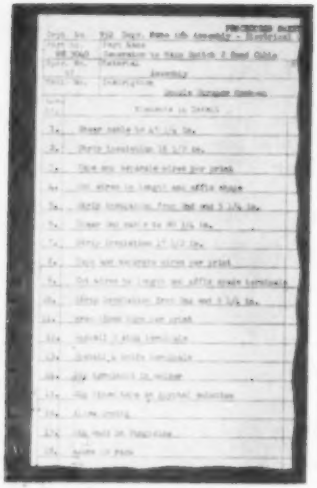


FIGURE 7—Time standards were established from this procedures sheet.

Cable No.	Prev. Std.	New Std.	Time Saved	% Saved
HD 5239	14.0	9.1	4.9	35
HD 5676	21.9	15.2	6.7	31½
HD 5677	32.0	14.6	17.4	54
HD 6765	71.5	41.6	29.9	41½
HD 8295	11.0	7.1	3.9	35½
HD 8352	42.0	32.9	9.1	21½
HD 8359	16.4	12.1	4.3	26
HE 3040	49.2	30.0	19.2	39
HD 8586	11.7	9.4	2.3	19½
HD 8753	29.4	11.7	17.7	60
HD 8754	29.4	11.7	17.7	60
HD 8763	11.9	11.0	.9	7½
Total per Dozer	340.4	206.4	134.0	39½%

Note the time saved on this cable assembly operation. Cable is a generator to main switch 2 conductor cable for double scraper hookup.

was changed to HE 3040. Material requirements were then changed to one piece 6 conductor cable 80¾ in. long and one piece 6 conductor cable 45¼ in. long. This resulted in 78¾ in. of cable saved, or 38½ per cent of total cable previously used.

Second item listed on the check list pertained to layout. A layout of the working area was drawn (Figure 4) making the disorganized state of operation obvious. A process analysis listing distances and time was charted (Figure 6). A session with a tool designer produced a special air actuated shear.

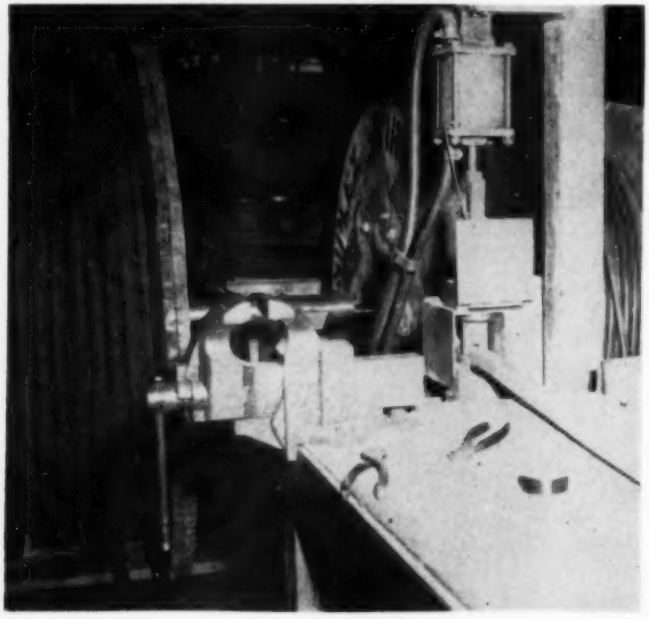
Then came the period of reconstruction. A new layout was devised (Figure 5) and the necessary production equipment moved. The air actuated shear was installed on the end of the work table and a graduated scale was added to eliminate measuring with a hand scale. Lighting facilities were installed and general efficiency improved. Operational procedures were written (Figure 7) and time standards established. All these items were recorded on "Check List—Things to be Done" (Figure 2) as "Accomplished."

Operators were then given instruction in the use of the procedures and when they had gained normal proficiency they were time studied and labor measurement standards were established. (Note tabulation.)

Even though we have accomplished a 38½ per cent material reduction and a 39½ per cent direct labor reduction, we do not feel that the job is perfected. Notes were made on the project record to supply leads for future projects and follow-up.

The successful culmination of such a project is considered to be a routine occurrence and as there is a never ending supply of projects and raw materials available, our serving men — What, Why, When, How, Where and Who — never have time to rest upon their past achievements. They have no desire to do so and continually strive to maintain the principles that have been adopted by our organization.

FIGURE 8—General view of cable work bench. Cable has been pulled through preparatory to actuating the air cylinder, which forces the shear edge through the cable. Pliers lying on the table are special crimping tools for fastening the space type terminals to the cables, a method of crimping suggested and developed by the operator during the course of the engineering study.



AUTOMATIC SHUTOFFS

for gas pipeline compressor stations

TECHNIQUES reported by ELTON STERRETT

High-pressure gas is harmless when confined within pipes, compressors and other station equipment. But in case of station fire or explosion it can add fuel to wreck the entire installation in seconds.

PIPELINES in the vast network of gas transmission systems carrying natural gas from the Southwest to markets in the north and east must have a compressor station at intervals averaging around fifty miles. Into each of these the gas comes at a pressure of around 400 psi, leaving after compression at a pressure of some 750 psi.

To provide automatic closing off of a compressor station in an emergency, one of the trunk lines has installed "air-motor" valve drives so that the valves can be spun shut without human aid, other than the tripping of the control. Gas from the line is stored in a tank, at a working pressure of 275 lb—being bled off the suction line when needed—and this supply, independent of weather, storms, or power line failure, is available for the chore of closing the massive gates.

The line leading to the station is closed by a hydraulic cylinder which provides the power, through rack and pinion, to close a quarter-turn plug valve. This quick-turn valve shuts off incoming gas first, to stop supply from further down the line. The hydraulic piston is driven by oil under pressure of the gas, which is admitted to a small tank, and which forces the oil from the tank into the cylinder.

Other valves, including the main discharge valve and a by-pass unit tying together for pressure equalization the two "Big Inch" lines serving as trunks, are closed by "compressed-air" motors, geared to the valve stems and giving power to spin the 275 or more turns required to close a 24-in. diameter line valve.

After the suction and discharge lines have been closed to exclude any flow of gas into the compressor station, a final valve is operated by the system, to open the closed section of station piping and allow any gas trapped therein to be vented. This removes any chance of high pressures being built up between the closed gates, and prevents possible explosion there.

Block gates, set at intervals of about 10 miles along the entire line to allow a section to be closed off in case of break, are also operated by the power within the lines—the power stored there by the act of compressing the gas to insure its movement through the lines.

By means of an ingenious crossover, the air motor on any block gate can be driven from the gas under pressure in the other line, or can be operated from the pressure flowing within the line. With the power stored within the compressed gas, the line can be closed off or opened by the air motor with only one man present, to trip the admission valve; and the line protected in a small fraction of the time required were manpower relied on to close the gates.

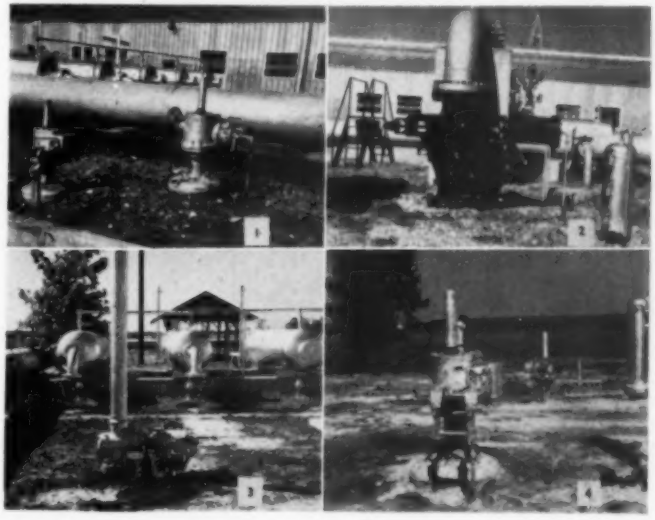


Fig. 1. The valve at the right controls delivery of gas from the compressor station to the outgoing mains. It is fitted with hand wheel for normal use, but may be spun shut by the air motor in emergency. The valve at the left controls the bypass between the two mains.

Fig. 2. Operated by the hydraulic cylinder at its right, this quarter-turn plug valve gives speedy shut-off of gas coming in to the station. The vertical tank at right contains oil which is forced into hydraulic cylinder when high-pressure gas is admitted atop the oil.

Fig. 3. This valve and the vent pipe attached to it operate in sequence with other valves to open the closed-off station piping to the air, and thus to prevent dangerous build-up of pressures within the piping.

Fig. 4. This air motor, on top of the block gate on one of the main lines, may be operated with pressure from either line, and spins the massive valve closed in a matter of seconds, against minutes when manual closing is used.

Reynolds Alloy Company, Sheffield, Alabama, details

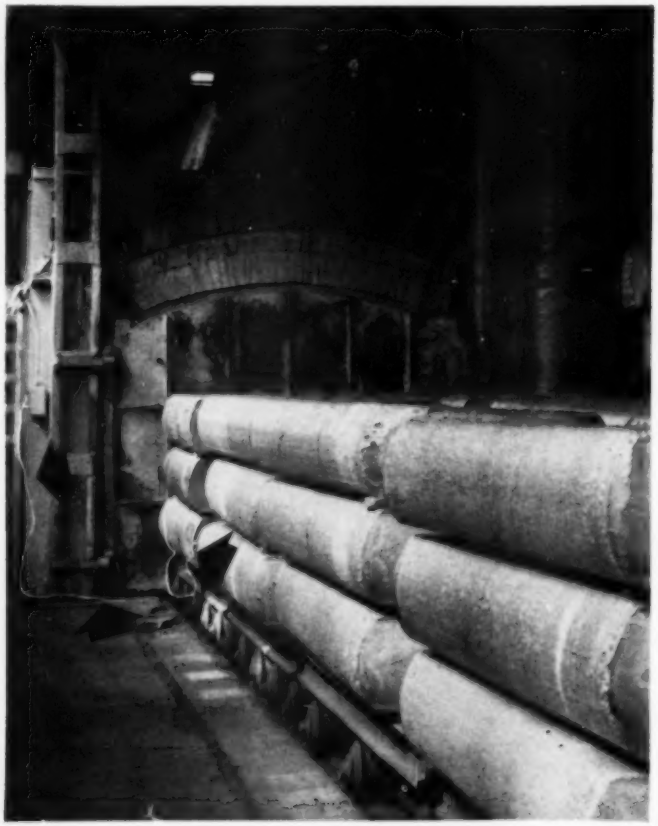
INSTRUMENTATION TECHNIQUES
to maintain quality and reduce losses

By TOM HURT, Chief Instrument Engineer and
F. B. McCOY, Assistant Chief Instrument Engineer, Reynolds Alloy Company

In producing finished alloy products—sheet, foil, wire, cable, etc.—temperature measuring and control problems in this Alabama plant are manifold.

ACCURATE measurement of metal temperature and close control of furnace heat at the Reynolds Alloy Company's Sheffield, Alabama, plant make possible semi-finished aluminum products that conform exactly to government and private industry requirements. Measuring and controlling accuracy depends to a very large degree on improved instrumentation and techniques.

In one respect, instrumentation requirements for the aluminum industry are equivalent to those for other heavy industry. Aluminum processing temperatures, however, are considerably more critical than those employed in processing other metals, and, in many cases, must be held to within 10 F. Thus, without sacrificing practicability for heavy duty service, temperature measuring techniques and control must hold metal temperatures precisely at a desired level. Otherwise, load after load of metal can be lost.



Car-type homogenizing furnace being loaded with aluminum ingots. Note thermocouple entering furnace. Present production necessitates a supply of 130,000 double feet of iron and constantan thermocouple wires a year for homogenizing operations. Both of the wires must be 20 gauge (to assure optimum fast response and thereby nullify any possible temperature over-shooting at start of and during soaking period) and individually insulated with Underwriters grade asbestos braid.

To make a thermocouple, technicians cut off the required 20 to 30 ft of wire, twist and weld the iron and constantan wires together to form the measuring junction, and supply the thermocouple thus fabricated to the furnace operators for insertion between the ingots. Thermocouple must remain in the furnace from 18 to 44 hours, at a temperature of from from 900 to 1100 F, depending on the alloy.

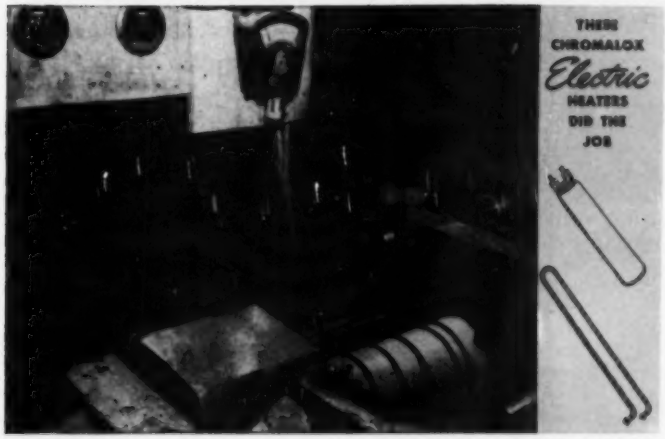
Typical Control Problem

Illustrative of the problems and the solutions evolved is the method outlined below of measur-

CHROMALOX

PROFITABLE IDEAS FOR BETTER PRODUCTION with ELECTRIC HEAT

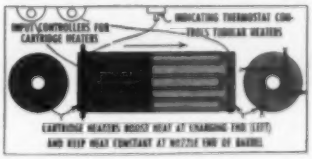
Production Tips



"ZONED" HEAT ANSWERS CRITICAL PROBLEM

Zones of heat, that are controlled easily and exactly to meet the molding characteristics of nylon just "come naturally" when Chromalox Electric Heaters are the heat source. Six thermostatically controlled Chromalox Tubular Heaters, clamped around the barrel, uniformly heat its entire length. Six Chromalox Cartridge Heaters inserted at the feed end act as booster heaters to liquefy the charge. Four Cartridge Heaters keep temperatures at the required levels in the nozzle. Each set of cartridge heaters is controlled by a Chromalox Input Controller; while an indicating thermostat controls the tubular heaters. Heat is regulated to the exact temperatures required for every mold size. Optimum operating heats are easily re-dialed when needed.

Diagram below illustrates the 3 heat zones, each controlled individually.

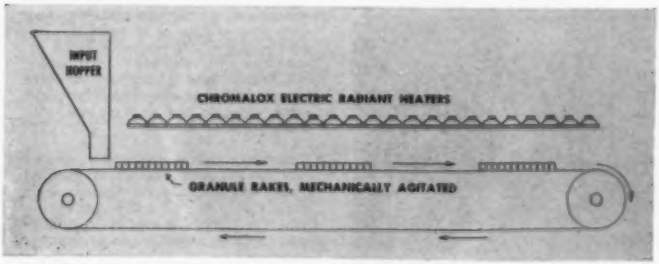


HOW PLASTIC RODS ARE BENT QUICKLY, EASILY, ECONOMICALLY

A table was built (photo A), with Chromalox Electric Radiant Heaters positioned above and below the portions of the rods to be heated. A forming press (photo B) was built to form the rods. About 30 rods, clamped together for efficient handling, are heated and formed at one time.

A—Concentrated *far*-infrared heat is absorbed efficiently and rapidly by plastic rods of all colors.

B—Forming jig bends heated rods quickly, was made in company's own shop.



DRYING PLASTIC GRANULES SPEEDILY AND UNIFORMLY

One plant's solution for drying granules was this conveyorized set-up which dries the granules enroute from hopper to barrel. Chromalox Radiant Heaters are "color-blind;" their *far*-infrared energy is absorbed almost equally fast by all colors. Radiation is uniform; output is regulated easily to avoid overheating and sticking.

Industrial Division
EDWIN L. WIEGAND COMPANY IC-67
7563 Thomas Blvd., Pittsburgh 8, Pa.

My heating problem is_____

☐ Have your Application Engineer get in touch with me.
☐ Send me a complete Chromalox Catalog.
☐ Put me on your mailing list for helpful Chromalox literature.

Name_____
Company_____
Street_____
City_____ Zone____ State____

C. B. Rogers and Associates, 1000 Peachtree St., N. E., **Atlanta 5, Ga.**; L. R. Ward Co., 2711 Commerce St., **Dallas 1, Texas**; 1814 Texas Avenue, **Houston 2, Texas**; 1519 South Boston Ave., **Tulsa 14, Okla.**; W. R. Phillips, Route 3, **Raleigh, N. C.**

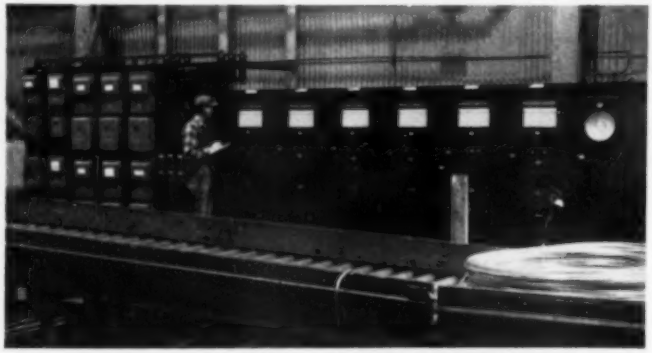
Furnace load being readied for annealing operation. Thermocouple wires are on the end of the load.

ing and controlling ingot temperatures in homogenizing or preheating operations. In this process, the actual temperature of the ingots is all important. Furnace heat must be regulated to produce precisely the proper work temperature. This necessitates direct measurement of ingot temperatures while they are in the furnace and control of furnace heat.

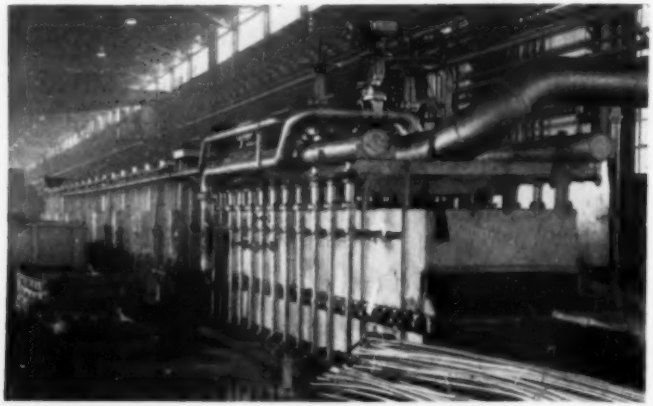
Expendable thermocouples, formed of 20 gauge insulated iron and constantan wires, are placed between the ingots as they are loaded on the car. Measuring junctions of the thermocouples are held in place by small blocks placed between the ingots. Sufficient length of thermocouple wire is allowed to permit connection to a junction box adjacent to the furnace door when the car is wheeled into the furnace. Two- and three-zone automatically controlled furnaces are employed. When the ingots are brought up to the proper temperature, timing starts and they are given precisely the correct soaking period at exactly the right temperatures. Both temperature and timing are extremely important because of the necessity of obtaining proper grain structure.

The difficulty encountered by Reynolds Alloy Company in obtaining 20 gauge iron or constantan thermocouple wires with asbestos braid insulation is noted at the bottom of the preceding page. Stock shipments are now available from the Industrial Division of the Minneapolis-Honeywell Regulator Co. Additional economies are obtained as a result of color coding the wires for homogenizing operations. The latter permits the negative wire to be identified at a glance without the use of a magnet.

Thermocouples are salvaged on annealing and other heat treating applications. Eventually, however, such items also need replacement.



Control panel for the cable mill stress relief furnace is shown above. Cable operation was developed by Reynolds for producing aluminum transmission line cable for the electric power industry. Structural mill electric heat treating furnace is shown in the lower view.



Time-Proportioning Relays

Paralleling accurate metal temperature measurement is the accurate regulation of furnace heat. The structural mill furnace, roller hearth furnace and sheet mill heat treating furnace for sheet, as well as the annealing furnace, are all equipped with control instrumentation designed to insure the clos-

(*Continued on page* 138)

When the Sheffield plant first started operations, it was impossible to buy 20 gauge iron or constantan thermocouple wires with asbestos braid insulations. Consequently, thermocouple wires were procured from one source and asbestos braid from another. Lengths of wire were manually inserted in the braid.

Obviously, this was a costly procedure. Continually expanding demand finally resulted in some manufacturers supplying the necessary thermocouple wire, but as a special item shipped from a considerable distance. Maintenance of a continuous daily supply was still uncertain.

Fabrication of the 20 gauge, asbestos insulated iron and constantan thermocouple wires as a stock item was then inaugurated by the Industrial Division of the Minneapolis-Honeywell Regulator Co., resulting in maintenance of stocks at its branch offices.

*QUARTER-MILE ROADBED...sun-baked, ice-swept...*YET STILL ON THE MOVE AFTER 14 YEARS OF COAL HAULING SERVICE!!!

Photographs may not lie; but, here's one that falls far short of telling the whole truth about the remarkable performance records chalked up by this Republic Rubber's Coal Handling Conveyor Belt.

But, then it's quite a story! You can see for yourself there's lots of sky overhead and that means sun . . . constant, unrelenting sun beating down on the conveyor belt surfaces, until seasonal changes bring about onslaughts of rain, snow and sleet.

The load, of course, is coal . . . an abrasive, mine run coal that's dropped through chutes and carried by the belt to stockpiles located throughout the dock area.

With these facts in mind and knowing that when the ship moves out, there's nothing to protect the belt against spraying lake water, consider this:

The belt is now fourteen years old and still going strong!!!

Purposefully, we've left the photo unretouched to show you just what a 14-year old Republic Rubber Conveyor Belt really looks like . . . to show you just how well a Republic Conveyor Belt stands against the ravages of time, hard labor and all the elements can throw at it. Incidentally, the dark spots you see on the belt's surface aren't worn places at all. That's water . . . water that makes ordinary conveyor belts mildew and prematurely fail, but holds few terrors for Republic Conveyor Belting because they're "mildew-proofed"!

It's to your advantage to learn why Republic Conveyor Belts like this can year in, year out, many times outperform and outlast other brands of belting.

Despite abrasion, impact, flexing, weathering or contact with heat, oil and chemicals, Republic Conveyor Belts continue to be your best insurance against breakdowns, short life and high handling costs.

Write us today for the name of your local Republic Rubber Distributor who can offer expert advice and fast service on all industrial Rubber Products.

Remember, whether it's hose, belting, packing or any one of hundreds of different molded and extruded specialties . . . **if it's built of rubber, Republic builds it better!**

REPUBLIC RUBBER DIVISION

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INDUSTRIAL RUBBER PRODUCTS

ELECTRICITY and ELECTRIC POWER

Part 6—Power Factor Application

By ROY W. WAGES
Division Industrial Power Engineer
Georgia Power Company
Columbus, Georgia

EDITOR'S NOTE: Last month the author defined power factor and explained how it is used mathematically in electrical calculations. This installment continues the discussion and shows how power factor enters into everyday electrical work. The reader might as well get out last month's article right now. He will need to refer to it while digesting the following treatment of power factor in the plant.

WHAT does power factor mean in our plant? And what does it mean to the plant maintenance men and plant electricians?

With a 67 per cent power factor existing in a plant that requires a true power of 100 kw, we have shown in the preceding article that the reactive power is 112 rkva. Now, you will recall that, in our discussion of power components, we stated that although this reactive power is required by almost all alternating current-consuming devices, it does no work. Moreover, although it does no work, this reactive power "takes up just as much room" in the conductor as it would if it actually did work. That's an important fact to remember. We will come back to the ill effects of too much reactive power in a moment. Before we do, however, let's talk some more about power factor.

In our sample plant we need 100 kw and now have a 67 per cent power factor. The kva now required, in order to get 100 kw of usable power is 150 kva. The reactive power is 112 rkva. Now suppose we figure out a way to raise the plant power factor to 90 per cent. Let's see what happens:

Remember: power factor is that circumstance that determines the final result or quantity of true power delivered; or, conversely, it is the factor that determines the amount of apparent power to be generated to produce a certain amount of true power. Mathematically, the power factor of a power system is "the cosine of the space angle separating the true and apparent power."

So, using our knowledge of vectors and the cosine relationship for triangles that we have learned, we will take our requirement of 100 kw, and our power factor value of 90 per cent and see what apparent power we need.

$$\frac{100}{\text{kva}} = 0.90$$

$$.90 \text{ kva} = 100$$

$$\text{kva required} = \frac{100}{0.9} = 111$$

One hundred eleven kva is considerably less than the 150 kva we required in order to get 100 kw of usable power when the plant power factor was only 67 per cent. Do you begin to see now why "power factor" is so important?

Now let's go back and talk some more about reactive power: As we said before, this reactive power, while needed in some quantity in nearly all alternating current devices, does no work. It does take up space in the conductor, in transformers and in motors themselves—cutting down on the useful output of those devices; because output or work is measured in watts not kva.

Moreover, as we have shown by our force diagrams, the amount of the rkva directly establishes the value of the power factor; and, conversely, the value of the power factor determines the rkva.

For example:

We first showed that when the power factor of our plant was 67 per cent, the rkva was 112 when the true power requirement was 100 kw. Then when we improved the power factor to 90 per cent, thus reducing the kva from 150 to 111, the rkva was only 48. In other words, when we reduce the rkva, the power factor goes up; when we increase the power factor we reduce the rkva. With that knowledge, together with the fact that rkva takes up just as much space in conductors, transformers and motors as does the work-producing kw, it can be readily understood that poor power factor adversely affects the electrical operations of any plant.

Let's work out a few examples to show just how power factor affects our equipment:

Conductors:

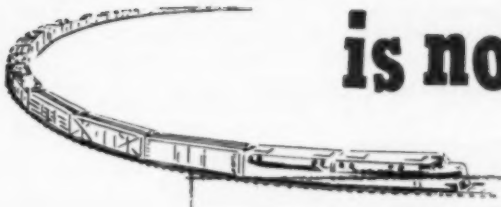
Using our basic requirements of 100 kw, we have already determined that at 90 per cent power factor the reactive power would be 48 rkva. At 67 per cent power factor the rkva was 112. If we raised the power factor of the plant to 100 per cent, the rkva would be 0. From this we can see that the size of conductor needed to supply 100 kw at 67 per cent power factor is just about twice the size needed to supply 100 kw at 100 per cent power factor.

Another way of viewing the problem is this: Suppose our present plant wiring is such that it can take 150 kva. Our present power factor is 67 per cent. Our present load requirement is 100 kw. We want to add some load to our plant, but for several reasons we hesitate to change the distribution system. We can add the load by improving our power factor and still not change the wiring. Let's see how this is done:

Present kva: 150
Present Load: 100 kw
Present PF: 67 per cent

Let's take a PF of 95 per cent

working on the railroad is now 50% faster



An installation of Yarway Impulse Steam Traps on sand dryers convinced this railroad that Yarways were best for them. With Yarways, sand was dried in half the time! More important—in a 24-hour period, *twice the amount of sand can be handled.* Now they are standardizing on Yarway Impulse traps.

In all kinds of plants Yarway Impulse Steam Traps help increase production by *getting equipment hot in a hurry—and keeping it hot.*

Users like these additional features of Yarway Impulse Traps, too—one moving part, low maintenance, small size, good for all pressures, low cost. Over 800,000 Yarways have been installed. More than 200 Industrial Distributors stock and sell them.

TRY A TRAP—FREE!

Be convinced. Install a Yarway Impulse Steam Trap on free trial anywhere in your plant. Send us a card and we'll send you the trial trap. For steam trap advice, call your nearby Yarway trap engineer.

YARNALL-WARING COMPANY

Home Office:
116 Mermaid Ave., Philadelphia 18, Pa.

Southern Representative:
RODER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.

YARWAY the steam trap designed with more production in mind

and see what results we get:

$$\frac{\text{kw}}{150\text{ kva}} = 0.95$$

$$\text{kw} = 150 \times 0.95 = 143$$

Motors:

Poor power factor can reduce the voltage at the motor. When the voltage value drops, it affects the performance of the motor by reducing the full load speed and reducing the starting torque. When this happens we, of course, get less production out of the machine that the motor is pulling.

Power Costs:

By our discussion of conductor sizes we have seen what adverse effect poor power factor has on the costs of wiring a plant. But what about direct cost of the power itself?

Most power companies sell power to industrial plants on a two-part rate: A rate that has an energy charge (based on the kilowatt hours) and a demand charge (based on the kilowatts). In some rates the demand charge is based on kva rather than kw.

Suppose that for our sample plant the demand charge is $1.25 per kva. Our basic requirement, as before, is 100 kw. At 67 per cent PF our kva demand would be:

$$\frac{100}{.67} = 150 \text{ kva}$$

$$150 \text{ kva} \times \$1.25 = \$187.50$$

Now let's see what the demand charge would be at 90 per cent PF.

$$\text{kva} = \frac{100}{.90} = 111$$

$$111 \text{ kva} \times \$1.25 = \$138.75$$

So improving power factor from 67 to 90 per cent results in a monthly saving of $187.50 − 138.75 = $48.75, or a yearly saving of 12 × $48.75 = $585.00.

In addition to the demand charge savings to be gained, it is often possible to save on the energy charges because some power companies offer discounts on energy charges for power factor improvement.

Thus, savings in the cost of conductor by either reducing the actual size of the wire, or increasing the capacity thereof through power factor improvement; savings in demand and energy charges for power; improved operations in the plant by reducing voltage drop and lines losses; all make the study of power factor an important one for plant engineers, electricians and maintenance men.

Determining Power Factor

That is all very good, a man in the plant might say. But having learned about power factor, how do I go about determining what the power factor in my plant is; and, having determined what its present value is, how do I improve it? Those are good, practical questions. And here are the answers:

To determine the power factor of a plant requires but three instruments: a voltmeter, an ammeter and a wattmeter. The job itself is a simple one. With a "clip-on" ammeter, the job is no trouble at all because the use of a "clip-on" instrument eliminates the necessity for breaking the circuit. However, use of the regular type ammeter is recommended. The ammeter voltmeter, and wattmeter can all be properly connected into the main feeder of the plant to provide readings of volts, amperes and watts.

The power factor can be then readily determined by the expression:

$$\text{Power Factor} = \frac{\text{Watts}}{1.73 \times \text{amps} \times \text{volts}}$$

Caution: Read the three instruments simultaneously; and check to see if the load is balanced over the three phase wires.

If the plant load varies much over the working day, it would be a good idea to call on the power company's local power engineer to assist you by the use of some recording instruments rather than indicating instruments.

Well, let's take some plant for an example and see how we go about determining power factor and the improvement thereof. We connect a voltmeter, an ammeter and a wattmeter into the circuit and we obtain the following readings: 100 amps, 460 volts, and 60,000 watts.

Since this is a three-phase system, we know that:

$$\text{Volt-amperes} = \sqrt{3} \times \text{volts} \times \text{amperes}$$

Substituting our numerical values obtained, we have:

$$\text{Volt-amperes} = 1.73 \times 460 \times 100 = 79{,}580$$

Now, $\text{Power Factor} = \frac{\text{Watts}}{\text{Volt-amperes}} = \frac{60{,}000}{79{,}580} = 0.754$

or, as it is usually expressed, 75.4 per cent.

Putting these values into a graphic representation of the existing conditions by means of a "force diagram" will give us a better understanding of the problem. To do that we must first determine the power factor angle whose cosine is 0.754. Looking into a table of natural trigonometric functions we find that the angle whose cosine is nearest 0.754 is 41 degrees.

We can now draw our force diagram (Fig. 1).

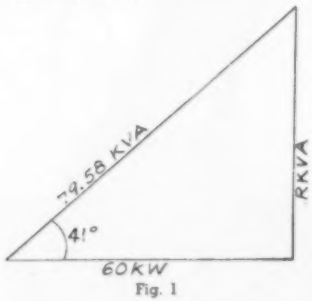


Fig. 1

Refreshing our memory on the triangle relationships, we know that:

$$\frac{60}{79.58} = \text{cosine 41 degrees} = 0.754$$

That is the "cosine function" we emphasized earlier in this article. In addition to "cosine function" of triangles, there is a "sine function" which may be expressed as follows from our force diagram:

$$\text{sine 41 degrees} = \frac{\text{rkva}}{79.58}$$

We can look in our "trig" table and find that the sine of 41 degrees is 0.656. Substituting this value in the equation above, we have:

$$0.656 = \frac{\text{rkva}}{79.58}$$

$$\text{rkva} = 0.656 \times 79.58 = 52.2$$

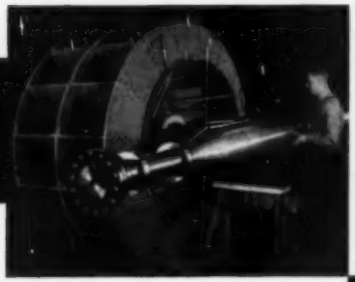
Mark that value of rkva = 52.2

"Buffalo"

Tips on Getting Best Results With FANS

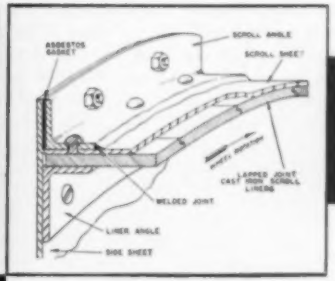
WHAT TO LOOK FOR IN CHOOSING AN INDUCED DRAFT FAN

ADEQUATE SHAFTS, COUPLINGS, BEARINGS



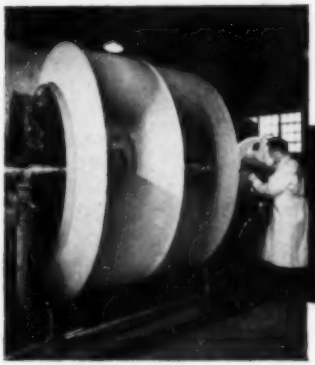
● The above forged steel shaft shows oversize construction in "Buffalo" Fans. Note thrust collars turned out of solid shaft material. Flexible "Buffalo" couplings have rubber bushings and allow for lateral motion. "Buffalo" bearings have large oil reservoirs, large bearing surface, babbitted and lubricated thrust shoulders, are water cooled when necessary.

PROTECTION AGAINST HEAT and EROSION



● Induced draft fans must resist constant heat and storms of erosive fly-ash. Above diagram shows detail of removable scroll liners provided for handling duct-laden air or fly-ash. Rotors may be provided with welded-on wearing strips to further lengthen the life of the already heavy-gauge blades.

EXTRA HEAVY ROTORS DYNAMICALLY BALANCED



● An unbalanced rotor means vibration. With heavy induced draft rotors, this can be destructive to shafts and bearings. All "Buffalo" wheels are balanced at the factory by precision equipment, shown above, ready for smooth operation. For additional information on selection of a draft fan, write for BULLETIN 3750.

RUGGED ACCESSIBLE HOUSING CONSTRUCTION

● Heavy steel plate, in removable sections that are easy to handle, makes for ideal induced draft fan housings. The photo above of a "Buffalo" Induced Draft Fan, shows convenience of assembly or dismantling. Note sturdy, oversize construction for long wear. Inlet vanes increase efficiency and minimize erosion.

and then set it aside for a moment.

Determining Needs

We now know that our plant power factor is 75.4 per cent, which is not too good. So let's suppose that we want to raise the power factor to 92 per cent. To see what is needed, we will have to draw a new force diagram whose angle between the kilowatt line and the kilovolt-ampere line is equal to an angle whose cosine is equal to 0.92.

The trig table shows that the angle whose cosine is nearest to 0.92 is 23 degrees. Employing our cosine function again we know that

$$\frac{\text{kw}}{\text{kva}} = \text{cosine 23 degrees} = 0.92$$

The kw doesn't change.

$$\text{So, } \frac{60}{\text{kva}} = 0.92$$

$$\text{or, } 0.92 \text{ kva} = 60$$

$$\text{whence, kva} = \frac{60}{.92} = 65.3$$

Constructing our force diagram again with these new values, we have Fig. 2, from which we can determine the value of the rkva that would obtain under these circumstances.

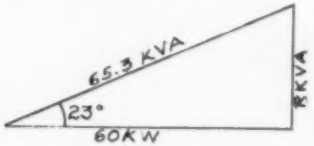


Fig. 2

$$\frac{\text{rkva}}{65.3} = \text{sine 23 degrees} = 0.39$$

whence, rkva $= 65.3 \times 0.39 = 25.4$

If the rkva at our present power factor of 75.4 per cent is equal to 52.2; and the value of the rkva that would exist at 92 per cent power factor is 25.4; then it is obvious that we have got to get rid of, or neutralize an amount of rkva equal to the difference in the two values which is:

52.2 rkva $-$ 25.4 rkva $=$ 26.8 rkva.

Thus we have reached the point where we understand:

(1) What power factor is
(2) How it affects our plant operations
(3) How we determine our plant power factor
(4) The worth of improving power factor
(5) What we must do to the reactive kva to raise the power factor to a chosen value from its present value.

Corrective Measures

We now know the WHAT, WHY AND WHERE of the problem. All we lack to complete it is HOW?

I think it is clear by now, that in order to neutralize the 27.1 rkva now supplied by the existing electric power system, we must supply that much *corrective* capacity from another source. The corrective kva that is needed (in this case 26.8 kva) is often spoken of as crkva or ckvar. I like the term "Corrective kva."

We can "generate" corrective kva's by two methods. (1) Operating a synchronous motor at a leading power factor; or (2) the use of devices known as "capacitors."

I think it wise at this time not to discuss the synchronous motor method. Not because it is not a good method or that it is not used. The use of synchronous motors to improve power factor, when belted to appropriate types of driven machinery, is an excellent example of an efficient solution to the problem. But the inclusion of the subject here would necessitate a long and involved foreword on magnetic fields, control equipment and motor design that is hardly appropriate in this paper. So let's just talk about capacitors.

Capacitors

A capacitor is nothing more than a kind of condenser which, in its simplest form would be two electrodes separated by an insulator. the old Leyden jar that you use to play around with in the high school science lab was a form of capacitor. Modern capacitors are generally made of layers of aluminum foil separated by layers of kraft paper. The foil and paper are very thin so that many layers of foil and paper can be bound together, impregnated with an insulating material, and then placed in a steel can or steel box. Leads are mounted and insulated, and the capacitor is ready for use.

Now without launching into a long lecture on physics and electrical theory, suffice it to say that because of the manner in which they are made, capacitors have the faculty of storing an electrical charge and then releasing it. This charge is stored in the capacitor's *electrostatic* field.

What makes this ability of a capacitor to store and release energy in this manner such a fine thing for us is that the capacitor stores such energy at the same time that an induction motor or other piece of induction equipment releases energy from its electromagnetic field. Then, when the induction equipment stores up energy on the next swing of the alternating current, the capacitor simultaneously releases its energy. In other words, the capacitor has the ability to "generate" magnetic current at the very same time the induction equipment needs it. Therefore, if you install capacitors on your plant power distribution system, those capacitors will supply the rkva rather than letting the power source supply it.

We can picture this solution by the use of a force diagram (Fig. 3).

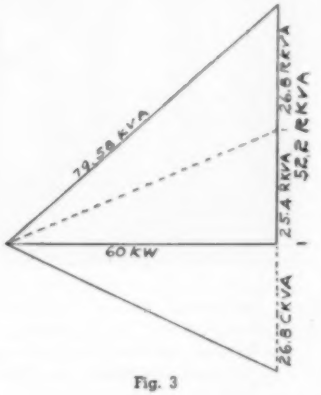
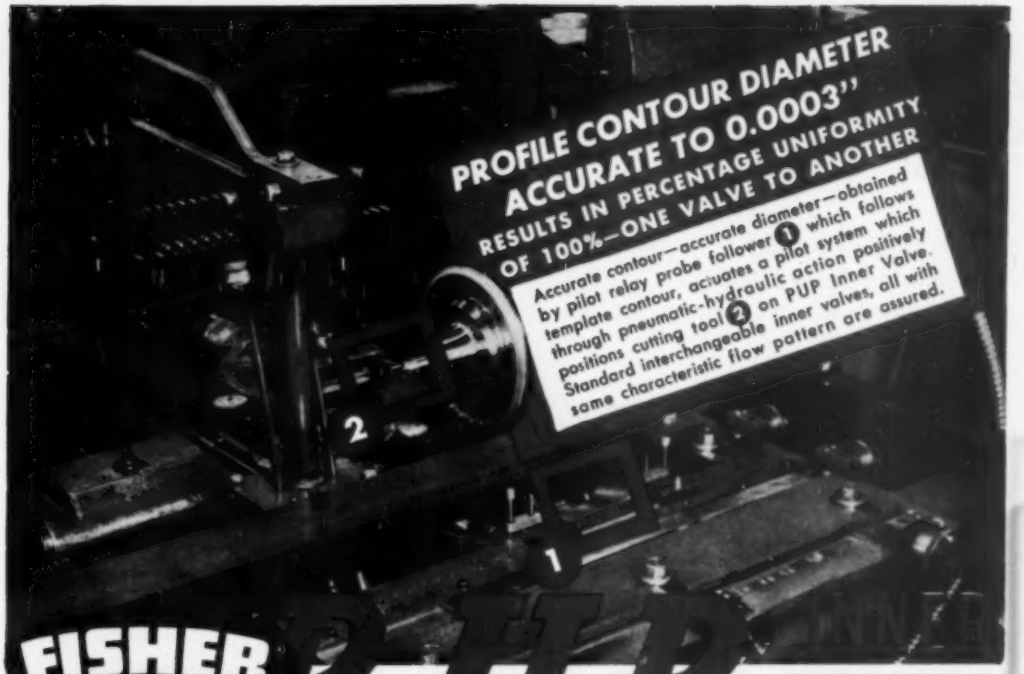


Fig. 3

The reason the force diagram is drawn like that is that reactance (rkva) is always drawn upward from the kw reference line and capacitance (ckva) is always drawn downward from the kw reference line. The difference between those two values is, of course, the rkva that will exist under the new value of power factor.

(*Continued on page* 138)



FISHER PUP VALVES

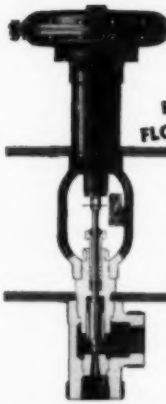
PUP = PROPORTIONAL UNIFORM PERCENTAGE

PRECISION MANUFACTURED FOR ASSURED PERFORMANCE

40 TO 1 RANGEABILITY

STAINLESS STEEL OR CAST STELLITE

EQUAL PERCENTAGE FLOW CHARACTERISTICS



Type 57T-DA direct acting diaphragm motor valve showing Micro-Form Pup in Fisher high pressure cast steel Design "D" angle body.

6 Years Old—Now Grand Champions

Excellent acceptance, phenomenal service and extremely satisfactory performance—that's the 6 year record of FISHER PUP INNER VALVES.

Available in two types, Micro-Flute and Micro-Form. Sizes ¼" to 1". Applicable to control valve sizes 1" to 2"

FISHER GOVERNOR COMPANY • MARSHALLTOWN, IOWA

FISHER LEADS THE INDUSTRY IN RESEARCH FOR BETTER PRESSURE CONTROL

HELPING the *MAN-IN-THE-PLANT*

ideas . . . tools . . . methods . . . devices

Jig Design Speeds Trimming Operation

A SET of three small hinged jigs and a hand router is being used in the sheet metal section at Temco Aircraft Corporation, Dallas, Texas, to trim tooling tabs from aircraft skin sections much faster than was formerly possible, and to eliminate most rework and scrap which resulted from the method formerly used.

Previous to the development of the jigs by *M. H. Guy*, 3143 Nicholson Drive, Dallas, a Temco sheet metal leadman, tooling tabs were removed with hand shears or band saws, with the method depending on thickness of the skins. These methods required excessive handling of skins which in turn resulted in scratched and marred surfaces. Often as much time was spent in burnishing and polishing as in actual trimming operations.

Each of Guy's jigs is made from two fiber strips, hinged together so that one fits flat on each side of a stack of skin sections. Each strip is faced with felt to prevent damage to skin surfaces. One of the fiber strips serves as a router guide and has a metal edge to prevent excessive wear. Two adjustable stops insure accurate positioning of the jigs on the skin sections. They are held firmly in place by quick clamps.

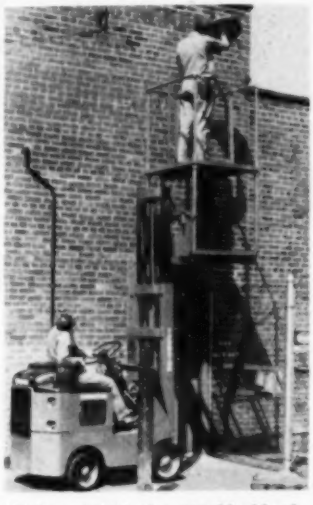
From two to ten skins may be trimmed simultaneously, with the number depending on the thickness of the material. Positioning pins are inserted in the tooling pin holes to keep the skins in alignment until the jigs are clamped in place.

Since the jigs have been in use, less handling of the skins is necessary, with a resulting reduction in scrapped material due to scratched surfaces. Aside from the savings in material, trimming time has been cut in half.

Jigs are made in sets of three, with one having a straight edge, one concave and one convex, so that tabs may be trimmed from curved as well as straight edges.

Fork Trucks—An Aid to Plant Maintenance

SOLIDLY established as one of industry's most valuable materials handling tools, the fork lift truck is gaining steadily wider usage as an aid to safer, more efficient plant maintenance.



Platform height plus variable lift of the Towmotor standard permits easy access to pipes, conduits, light fixtures and other plant equipment located on walls or ceiling. Before "mechanized maintenance", the same jobs consumed many man-hours and injuries were an ever-present problem.

Here is a Towmotor Fork Lift Truck being utilized as a portable elevator. Specially built for maintenance department functions, the double-decked platform rests securely on the forks.

It eliminates the element of risk that always attends the use of ladders and improvised scaffolding. Lower deck provides carrying space for maintenance materials needed to handle a number of varied jobs.

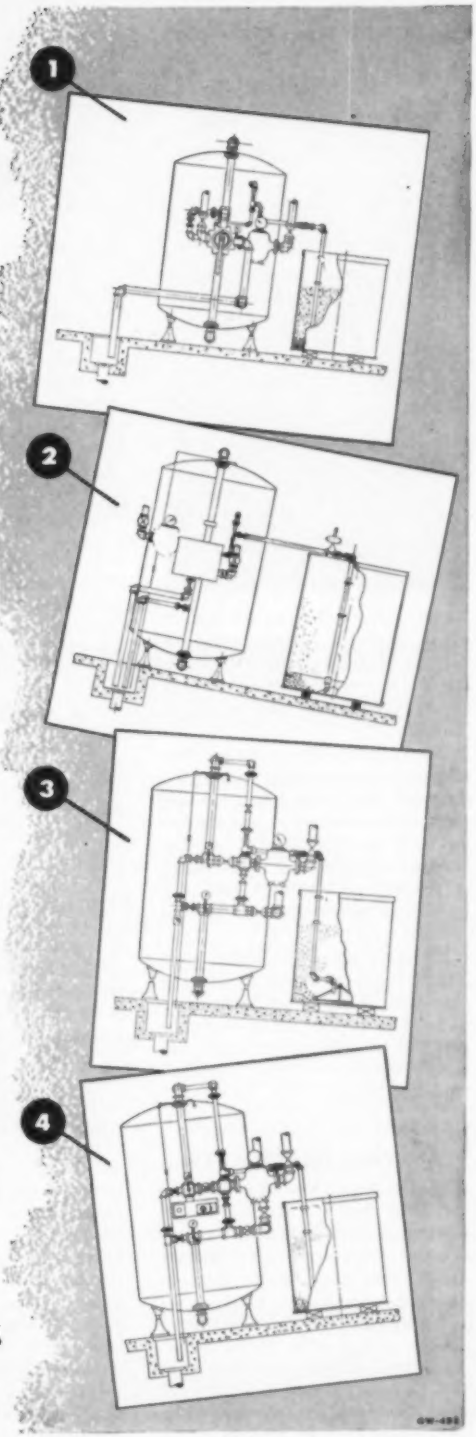
GRAVER *gives you*

ZEOLITE WATER SOFTENERS

with a choice of

4

DIFFERENT CONTROLS



Each plant has specific problems requiring individual solution. Typical problems include varying loads, varying water composition, skill of operators, labor and chemical costs, and space availability.

That's why GRAVER zeolite water softener designs in clude 4 types of controls:

1. **Multiport disc valve, operated manually**
2. **Multiport poppet valve, operated manually and automatically**
3. **Standard gate valves, operated manually**
4. **Individual diaphragm valves, with automatic and manual pilot control**

All components of each type of GRAVER control are *standard available equipment,* of proven operating dependability, ease of adjustment and low maintenance cost, and with readily obtainable replacement parts.

Choice of selection in controls and valves as well as other components is a feature of all GRAVER Zeolite Softener installations. GRAVER Zeolite equipment includes sodium and hydrogen zeolite softeners, hot zeolite after-treatment, and demineralizers; and GRAVER Zeolites include all the modern highly effective synthetic resins of proven performance, checked by experts in the field of ion exchange.

Write for recommendations and complete information on your particular needs and request your free copy of the technical paper "Present Practices in the Use of Ion Exchangers."

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Division of Graver Tank & Mfg. Co., Inc.

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In Mexico: Proveedores Tecnicos, S. A.: Puebla 259, Mexico 7, D. F.

Relief Line Anchor

REACTION forces when high-pressure flow lines are relieved through angle-type fittings require some type of anchor to prevent possible overstressing of the piping.

One such anchor is shown, in which a 4 in. steel channel is fastened to a heavy concrete mounting block through bolts extending through the lower flange of the channel.

U-bolts of the proper diameter to take the stress are then placed over the valve bodies just inside the bolt circle of the connection, and the two branches of the U are carried through holes in the upper flange of the channel and lock nuts run up in the space provided by the channel.

By using torque wrenches when setting the nuts on the U-bolts, the hold-down is uniformly stressed so as to take all the lifting force exerted by sudden flow through the relief valves. — *Elton Sterrett, Houston, Texas.*

Driving Shaft Keys

DURING the building of some large prime movers for the power plant of a big steel company, it became necessary to permanently drive some main shaft keys to fasten the crank discs in place.

The engines had four horizontal double acting 44 x 54 in. cylinders, arranged in two lines, with two bed plates, each weighing 125 tons for each of the two units. The shafts were 36 x 48 in. in the bearings, and 42 in. diameter in the "swell" or seat where the flywheel and electric rotor were placed in the center of the 40 ft long shaft. The cast steel crank discs weighed 14 tons each, and were provided with 20 in. diameter by 18 in. long crank pins cast integral on the discs. Each disc was keyed on the shaft with 4 x 6 in. keys, the cranks being arranged with the pins at 90 degrees to each other. As there were 50 of the keys to be driven, a special arrangement was justified.

Management had a ram forged up, about 10 in. in diameter by 3 ft long in the body, with a handle forged integrally, tapering down to about 4 in. at the end of its 15 ft length. An eye bolt in the side of the ram at the balance point of its weight into which the small crane hook could be placed, completed the ram. Its total weight was around 1500 lb.

Hitting the Blow

The shaft, with both discs pressed on, was set up lengthwise of the erecting shop. The keys, painted with clean white lead to guard against scoring, were placed in the keyways for driving. The ram was picked up by the crane and a crew of eight men were placed so the driving end of the ram bore was solidly against the key head, which was about 4 ft above the floor. Each key had a buffer head made on it, with a V annular groove cut around the key on all four sides, so after the key was driven "home," the bruised stub could be broken off, leaving a fairly smooth surface on the end of the key.

The crew pulled the ram back in line with the key, and using short blows at first, started the key in the keyway. As the work progressed, and the gang got into the rhythm of the job, they were using a 20 ft run, and really hitting heavy blows, which were graduated as the finish line came near so as to guard against overdriving.

When the proper point was reached, the ram was turned crosswise of the "stub" which was left exposed, and drawn away to strike a blow with only a 1 ft swing. It seemed like a silly performance to use so short a blow after the heavy ones used in driving the key home, but the annular groove made the key so weak to a sidewise blow that it popped off like a clap pipe stem, leaving a presentable fracture.

I have often used the same technique with makeshift rams, wherever some heavy blows could be used in construction work. The ram was often no more than a heavy oak railroad tie hung on a single line. It is a nice trick to know when it can be used sensibly. The blow struck can be plenty heavy and does not depend on the strength and skill of one man, as is the case with heavy sledge work. It is a relief to a gang leader to know how to do a job involving heavy slugging easily with common labor, that otherwise would require a highly trained strong man.—*H. B. McDermid.*

Painting Wire Fence

THE JOB of painting wire fencing can be greatly facilitated by using a special, long-nap, lambswool roller, thoroughly saturated with the coating material.

As illustrated, the roller is dipped into the container of material (usu-

MORE POWER FOR GREECE

One of the four Detroit Rotograte Stokers of eight feeders each.

DETROIT ROTOGRATE STOKERS TO ISLAND OF EUBOEA

Four Detroit RotoGrate Stokers have been shipped to the Kingdom of Greece. Each Stoker will fire a 200,000 pound per hour capacity unit. Design is based on locally mined low-grade Lignite of 5,000 minimum BTU per pound and 35% moisture, and an ash fusing temperature of 2140° F with preheated air of 325° F. Steam pressure will be 925 psi, at 905° F. TT. The installation is at Aliveri Thermal-Electric Station, Island of Euboea. Design is by Burns and Roe, Inc., Engineers, New York, under supervision of Ebasco Services, Inc.

Detroit RotoGrate, an improved spreader stoker, will burn all grades of Bituminous Coal or Lignite with high thermal efficiency. Controlled turbulence permits higher burning rates per square foot of grate. Reinjection system is rugged, dependable.

Write for Detroit RotoGrate Bulletin.

DETROIT STOKERS have been selected for plants around the world such as in:
ENGLAND • SCOTLAND
DENMARK • FRANCE
BELGIUM • ITALY • SPAIN
PORTUGAL • MOROCCO
GREECE • TURKEY
RUSSIA • POLAND • NIGERIA
UNION OF SOUTH AFRICA
INDIA • MALAYA • CHINA
AUSTRALIA • NEW ZEALAND • TASMANIA
PHILIPPINES • HAWAII
ALASKA • COLOMBIA
CHILE • BRAZIL

There is a Type and Size Detroit Stoker for Every Industrial Need

4842

DETROIT STOKER COMPANY

ally 5 gallon containers are best) and pulled up on a flat board surface of approximately the same width as the roller to remove running surplus material. The roller is then applied to the area to be coated. Even the barbed wire on top of the fence can be rolled on, although the pipe framework and supporting arms holding the barbed wire are best done by brushing after the fence has been roll-coated. —Courtesy. *Rust-Oleum Corporation.*

Shaper Attachment Improves Operation

A SPECIAL attachment for Yates American Shapers is being used at Temco Aircraft Corporation, Dallas, Texas, to enable one man to trim large contour frames in less time than was required by two operators under the methods previously used.

Previous to the development of the device by Floyd I. Wright, 123 Summit, Grand Prairie, Texas, a Temco employee, the company followed the general industry practice of bolting the frames to wood forms for trimming. As some of the frames were large, the forms were heavy and hard to handle. Two men were required to handle many of the forms and the hands of the operator were in constant danger from the unprotected cutting blade. In the event of a warped form, it was often necessary to discard frames due to incorrect trimming.

The attachment consists of three fiber rollers mounted on a section of angle iron. Two of the rollers are mounted on a vertical axle and roll on the inside of the frame's flange, holding it against the saw. The third roller, which is mounted on a horizontal axis, rolls on the flat surface of the frame, holding it against the table top. The entire assembly is secured to the guide angles of the shaper by two quick clamps.

Since Temco adopted Wright's device, there has been no necessity for a large stockpile of wood forms. One man can perform almost all trimming operations, as the attachment does all holding, making it unnecessary for the operator to do more than feed the frames to the saw. There is no necessity for the operator's hands being near the blade, thus eliminating a safety hazard.

Bearing Clearance

THIS year we have burned out two thrust bearings on our turbines. The usual procedure is to set the thrust bearing and move the rotor back and forth longitudinally to assure ample clearance.

After inspection and repair, unit was reassembled and clearance checked in the usual way or "according to the book." However, the thrust bearing lasted only a month and was burned and practically disintegrated when removed. Another one was installed and checked, but soon became noisy and rough.

We then began checking drawings to see where our clearance was coming from. Since the particular turbine had seen about 30 years of service, we decided there might be wear in two other places which could give the appearance of thrust clearance, while no clearance actually existed in the thrust assembly. We were actually crushing the thrust bearing in assembly.

When we had to shut the turbine down, inspection of the rotating thrust washers confirmed our theory. This time we didn't "follow the book" but checked our thrust clearance between a stationary washer and the shoulder on the shaft to be sure we had clearance in the thrust. The reassembly was completed, turbine put on line, and to date, the thrust bearing shows no signs of the old trouble.

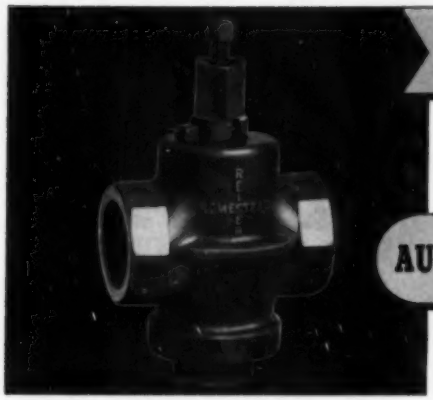
Staging Design For Engine Wiping

INCREASE in size of the engines used in modern gas trunkline compressor stations has made units of 2,000 hp common, and has at the same time stepped up the problem of getting at the engine to keep it wiped clean.

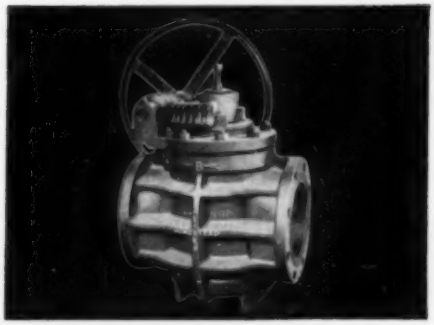
On one of the gas trunklines a light scaffold, mounted on castors and equipped with a means for locking the castors out of the way at one end to secure the unit against undesired shifting, enables the shift engineer to check his unit much more quickly and with greater safety than when using the conventional ladder.

Up to the platform the steps are fixed in place, but those above the platform are hinged to the back edge of the rack so that they may be folded back to make the entire platform available as a work space when it comes to the proper level.

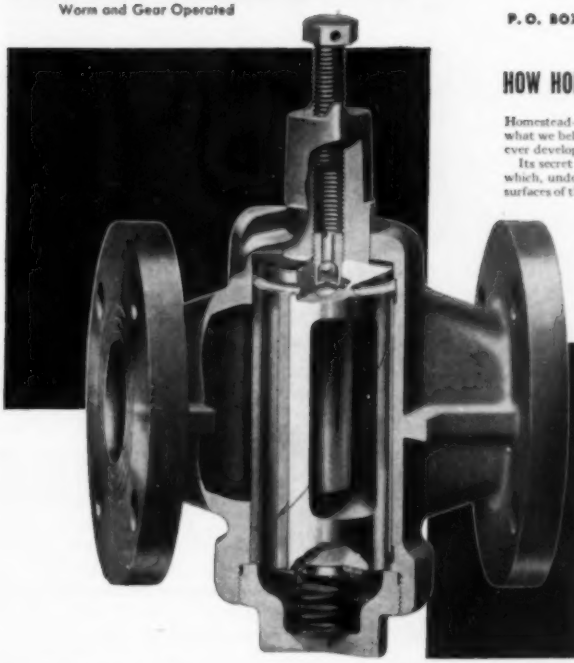
Pipe railings and a backstop of the same material enclose the working areas and add to the safety of the device.—*Elton Sterrett, Houston, Texas.*



Semi-Steel or Cast Steel Threaded or Flanged Ends



Worm and Gear Operated



THESE VALVES... HAVE CURED A LOT OF MAINTENANCE HEADACHES, because they...

AUTOMATICALLY ADJUST FOR WEAR

Wear, that in most valves would cause leakage and necessitate complete valve renewals, simply doesn't faze a HOMESTEAD-REISER.

Its two-piece, wedge-acting plug constantly and automatically adjusts itself to make up for wear as wear occurs. The valve acts on its own. *It is SELF-SEALD!*

Result: Extra long, leakless service life . . . more operations between lubrications . . . less maintenance . . . lower plant operating costs.

Available in semi-steel or cast steel; 100% port area or Venturi type; sizes ½" to 14" for steam working pressures to 150 lbs.; or oil . . . water . . . gas to 200 lbs.

Complete data and prices will be sent on request. Write today for VALVE REFERENCE BOOK No. 39. No obligation.

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VALVE MANUFACTURING CO.
P. O. BOX 70 "Serving Since 1892" CORAOPOLIS, PA.

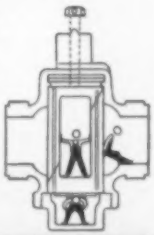
HOW HOMESTEAD-REISERS SEAL THEMSELVES

Homestead-Reiser's self-sealing action is based on what we believe is the most effective sealing principle ever developed for lubricated plug valves.

Its secret is the wedge-action of the two-piece plug which, under line pressure, causes the finely finished surfaces of the plug to press outward against the body.

A full lubricant seal surrounds the ports, and the top and bottom of the valve.

The self-sealing, wedge action keeps the plug surfaces in constant contact with the mirror-like bore of the body. It provides automatic adjustment for wear and assures extra long valve life with maximum leakless service.



HOMESTEAD-REISER
Self-Seald...Lubricated
PLUG VALVES

$$$ FOR YOUR IDEAS

Send your ideas, methods and short-cuts to *Southern Power & Industry*. Payment is made for suitable material — a photo or rough sketch will make your idea more valuable. Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

Southern Power & Industry
806 Peachtree St., N. E.
Atlanta 5, Georgia

Valve Extension Handle

ON buried lines operating under high pressures, the hand wheel frequently not only comes too low for convenient operation but also fails to provide sufficient leverage for easy manipulation.

One chief engineer designed an improvement on the usual stem extension by bolting to the hand wheel a plate with a central core or extension large enough to accomodate the rising stem of the valve.

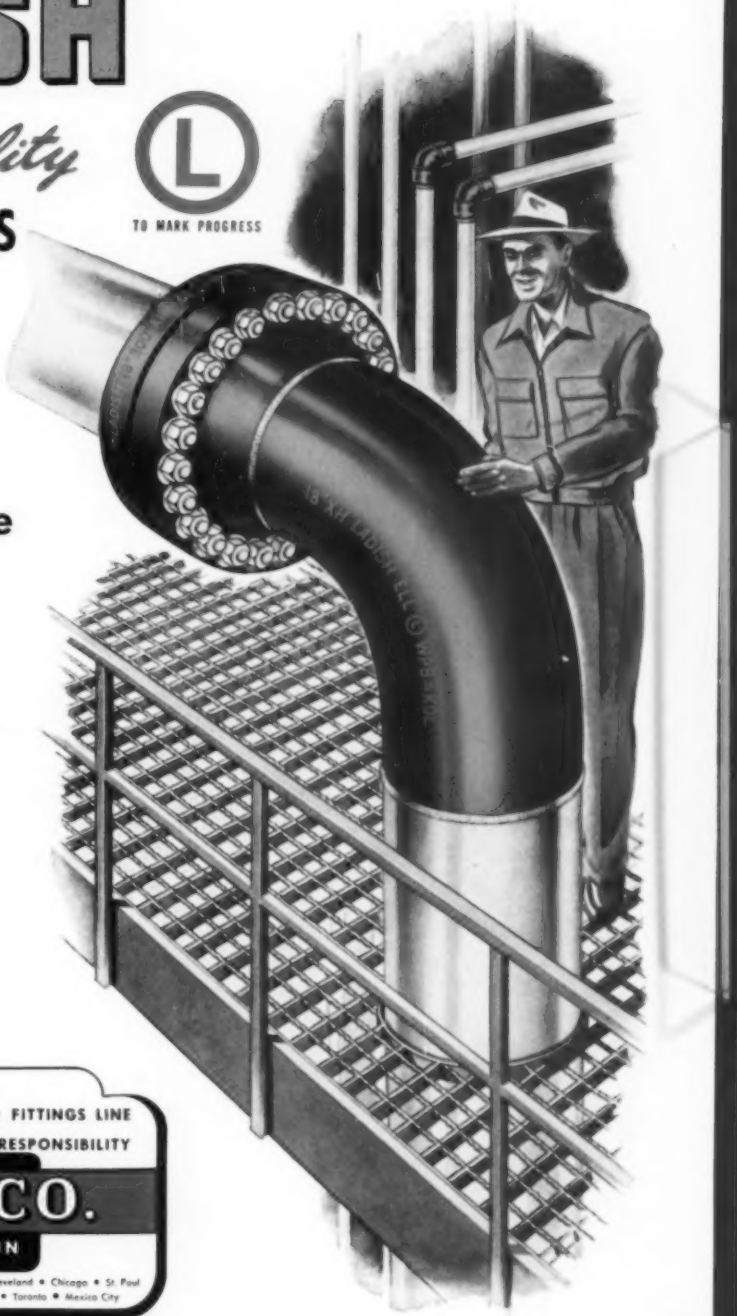
Slots cut into this core unit take pins from a T-shaped unit which enables a length of pipe or a stout stick to be used to increase the leverage on the valve wheel. The bottoms of the slots for the pins are so positioned that the pins are lifted from their resting place as the rising stem approaches the top of its travel. Thus the clearance below the pins affords a ready indication that the valve is open.—*Elton Sterrett, Houston, Texas.*

LADISH

Controlled Quality

PIPE FITTINGS

TO MARK PROGRESS



metallurgically sound for maximum service

Sound metallurgy . . . the result of unsurpassed facilities and advanced laboratory controls . . . provides the maximum of dependability in Ladish Controlled Quality fittings. Every phase of metal quality . . . composition, structure and physical properties . . . is continuously safeguarded—and certified proof of metallurgical integrity is available to users of Ladish fittings.

THE COMPLETE *Controlled Quality* FITTINGS LINE
PRODUCED UNDER ONE ROOF...ONE RESPONSIBILITY

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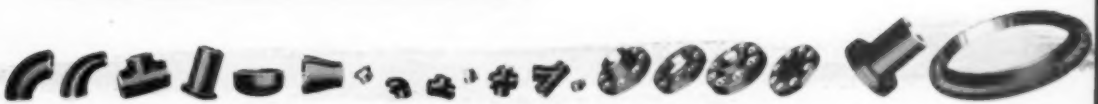
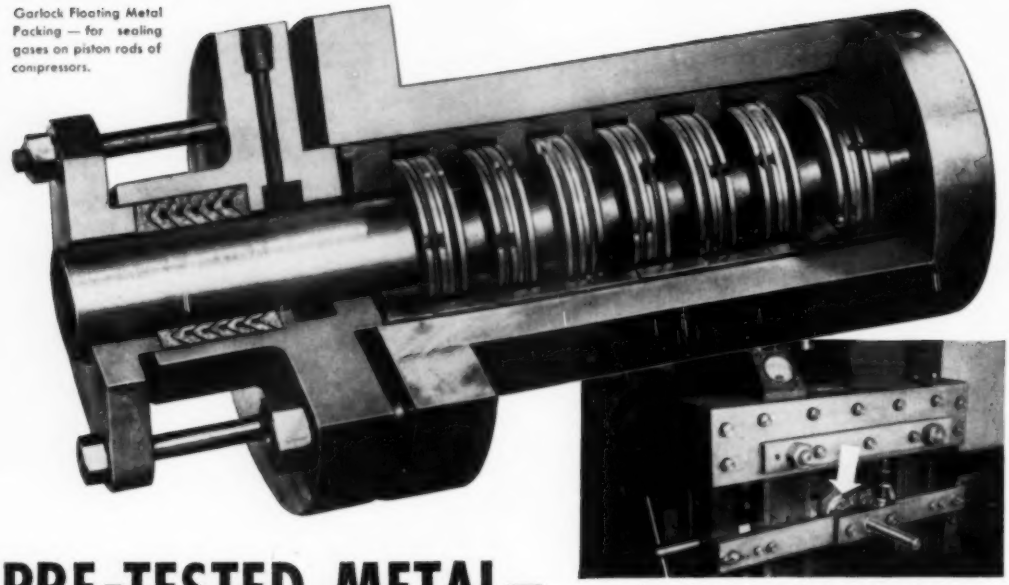


Garlock Floating Metal Packing — for sealing gases on piston rods of compressors.



PRE-TESTED METAL—

Above: Arrow points to foundry specimen being wear-tested on specially designed machine.

Your assurance that Garlock Metal Packings are right for the job!

Designed specifically for high pressure and high temperature service to seal air, ammonia, steam or any gas on piston rods of compressors and steam engines, Garlock Metal Packings are quality-controlled throughout their entire manufacture.

Starting with the metals of construction, every "heat" of cast iron and bronze is accelerated-wear-tested on a special machine by an independent organization before the materials are shipped to Garlock. If the wear test specimen does not pass Garlock's rigid standards, then the entire "heat" is rejected.

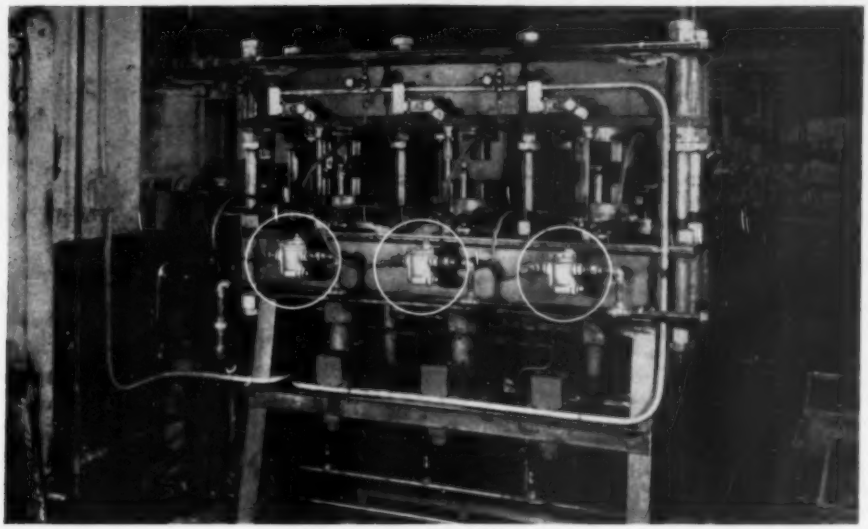
Then, using these tested, high-grade materials, Garlock Metal Packings are accurately machined to exacting specifications by experienced craftsmen. Throughout every operation extreme precision is the watch-word.

The product of this rigid pre-testing and precision manufacture is a metal packing that you can be sure will meet your service requirements. So, standardize on Garlock Metal Packings—they last longer, require less maintenance.

THE GARLOCK PACKING COMPANY
PALMYRA, NEW YORK
In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

GARLOCK FLOATING METAL PACKINGS

Relies on Armstrong "Unit Trapping" to maintain molding press temperatures within ±5°F.



Uniform molding temperatures reduce leather cup rejects by 40%!

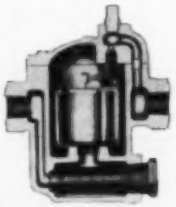
MANY a plant has accepted erratic temperatures of steam heated equipment as a necessary evil. Not so at Albert Trostel & Sons Company, Milwaukee, manufacturers of molded synthetic rubber and leather parts. They unhesitatingly replaced an electrically heated molding press, that varied in temperature as much as 30°F., with a steam heated press because they knew from previous experience that Armstrong Unit Trapping would give them uniform temperature control. Their confidence was not misplaced. An indivdual Armstrong steam trap on each station of the press keeps temperatures uniform within plus or minus 5°F. Molded leather cup rejects have been reduced by 40% and production greatly increased.

The benefits of Armstrong Unit Trapping are easy to understand. First, if you drain more than one unit with a single trap, any variation in pressure between the units will cause condensate and air from a higher pressure unit to block drainage from a slightly lower pressure unit or section. With an individual trap on each unit this cannot happen. Secondly, Armstrong traps discharge condensate and air as fast as they accumulate so that every unit is always full of hot dry steam and, hence, at maximum temperature.

Let your local Armstrong Representative look over your condensate drainage system—he sells Armstrong traps under a *satisfaction-or-your-money-back guarantee.* Call him or write:

ARMSTRONG MACHINE WORKS
806 Maple Street • Three Rivers, Michigan

BONUS VALUE



Built-In Strainer Trap Saves Money, Maintenance

Small traps need strainer protection against dirt and scale. Howard Knoller, V.P. & Plant Engineer of Albert Trostel & Sons Company, uses and likes Armstrong No. 880 traps with built-in strainers because: they cost less than a trap plus separate strainer; save fittings and installation labor, and the strainer can be cleaned without removing trap or shutting off steam.

You Always Get Greater Efficiency When You Use Armstrong Unit Trapping

FREE
44-PAGE
STEAM TRAP BOOK
Gives Complete Data

FILL IN AND CLIP TO YOUR COMPANY LETTERHEAD

ARMSTRONG MACHINE WORKS
806 Maple Street, Three Rivers, Michigan

Please send me The Steam Trap Book.

Name .....

Title .....

Leather Belting Maintenance

By JULIAN S. HARRIS

Atlanta Belting Company
Atlanta, Georgia

AS MANUFACTURERS of leather belting, we are definitely interested in its maintenance. It is the most economical and efficient drive for machinery. However, to get the best results from any product a certain amount of attention must be applied. We will attempt to outline some of the troubles with leather belts that confront plant engineers — their causes, and possibly their remedies.

We have more trouble with **belt slippage** than any other thing. If leather belts are slipping they will let it be known by the squeaks or noises they make. Slippage can also be detected by visual inspection. If the belt has been slipping it will have a glaze on the side running against the pulley. This glazed surface causes a leather belt to lose much of its inherent high coefficient of friction and should be corrected immediately. Continued slippage not only loses production but it will also ruin a belt. A glazed surface on a leather belt can easily be removed by buffing and oiling lightly. Of course, the belt should be tightened before it is again installed on the drive.

The causes of belt slippage are often loose belts, overloaded belts, and belts that are too dry. If the trouble is caused by loose belts, the correct thing to do is to adjust the belt tension. For overloaded belts, use wider or heavier belts. If belts are too dry use the proper lubricant which can be furnished by any belt manufacturer. Sometimes excessive stretch will occur because of overload. This can also be remedied by using wider or heavier belts.

Belt stretch sometimes brings belt salesmen complaints that are not justified. Upon investigating we often find that an old belt has been taken off a drive and the new belt cut exactly the same length as the old belt. Of course, the old belt has stretched and the new belt is so long that it will begin to slip almost immediately. The correct and proper way to install a belt on any drive is to get the proper measurement with a steel tape and then cut the belt approximately ⅛ in. per foot shorter than the measurement. By doing this you will save time and machine stoppage due to slack belts. If the belts are to be installed endless it is always best to use clamps and rods to pull the belt in place and hold it while the splice is being made up.

Some other troubles that are often overlooked are **crooked belts** that were improperly installed, and misalignment of pulleys, causing the belts to run to one side of the pulleys and sometimes even off the pulleys. This trouble can be caused by having too much pulley crown. The pulley crown should be approximately ⅛ in. taper per foot.

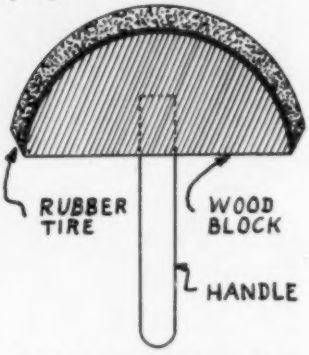
When you find belts **cracking on the outside ply** you will usually find that it is caused by too much belt tension or pulleys that are too small. It can also be caused by using belts that are too thick. When the cracking occurs on the inside ply, this is usually caused by belt slippage and can be corrected by adjusting the belt to the proper tension.

Do not overlook the Uni-Pull Drive because it is one of the most economical and efficient drives that can be installed. There are three types of tension control motor bases available for this drive:

The Pivoted Type Motor Base: The weight of the motor is the main factor in automatically maintaining uniform belt tension in a Uni-Pull Drive employing this pivoted type of base.

The Econ-O-Matic Base: This base consists of a pivoted cradle which enables the reaction torque of the motor to maintain the proper tension in the belt.

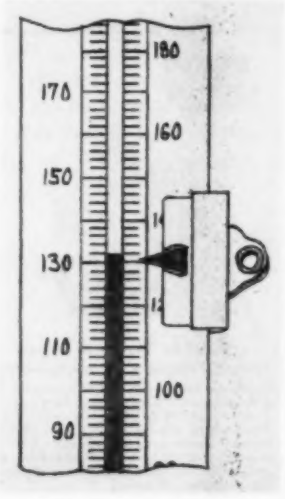
The Automatic Base: In bases of this type, tension control is maintained by means of adjustable springs.



If a little more attention is given to keeping belts clean, longer belt life and better performance can be expected. This can be accomplished by using a 4 in. cross section cut from an old auto tire and nailed on a wood block cut in the shape of the tire. Belts that are cleaned by this technique have a "velvet like" appearance and feel. The cleaning method will not injure the belt.

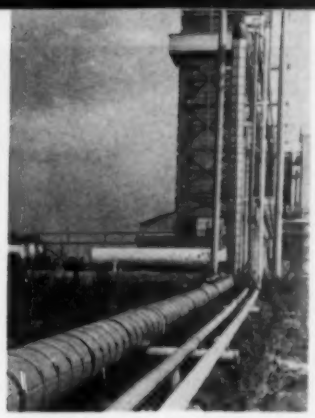
Thermometer Marker

BY soldering a small arrow, cut from sheet metal, onto one jaw of an ordinary spring type paper clip, as shown, a handy clamp indicator arrow can be made for use on a thermometer to show at what point the indicating liquid should be, under satisfactory conditions— *Thomas Trail, Maryland.*



(*Continued on page* 133)

This big new Oklahoma refinery has used a new kind of aluminum jacketing throughout on both insulated lines and towers and vessels. Light in weight and low in cost, this new Childers Aluminum Jacketing cut installation costs. It is also expected to cut maintenance costs.



Childers Aluminum Jacketing is used here on a cross-country transfer line at a large chemical manufacturing plant in Texas. This is a rugged test for any jacketing, but the light-weight aluminum used in this jacketing should stand up to weather and chemical corrosion it encounters.

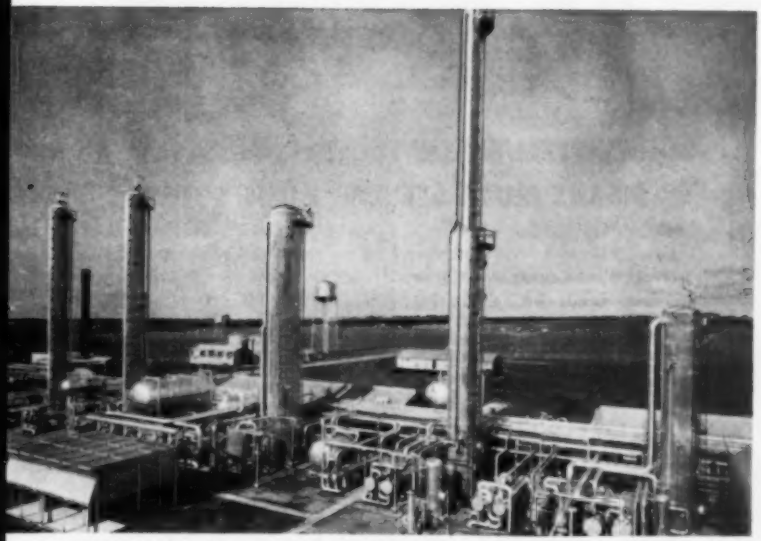
"Good Housekeeping" is the word in this gas pipeline pump station. The insulated lines are handsomely protected by Childers Aluminum Jacketing, which should last as long as the plant itself. The jacketing requires no painting and very little other maintenance. It even allows the interior of the plant to be washed with a hose without harm to the insulation. The chief engineer reports: "We have standardized on Childers Jacketing for all our insulated lines. It is doing an excellent job for us and saving us money."

How 5 plants cut costs of jacketing insulated lines

Weather-resistant, low-cost, easy to put on—these are big reasons for the growing popularity of a new jacketing, specially engineered for insulated lines. It is made of .006" thick aluminum and comes with or without a moisture barrier. It is called Childers Aluminum Weatherproof Jacketing. You can write for a free sample without obligation.

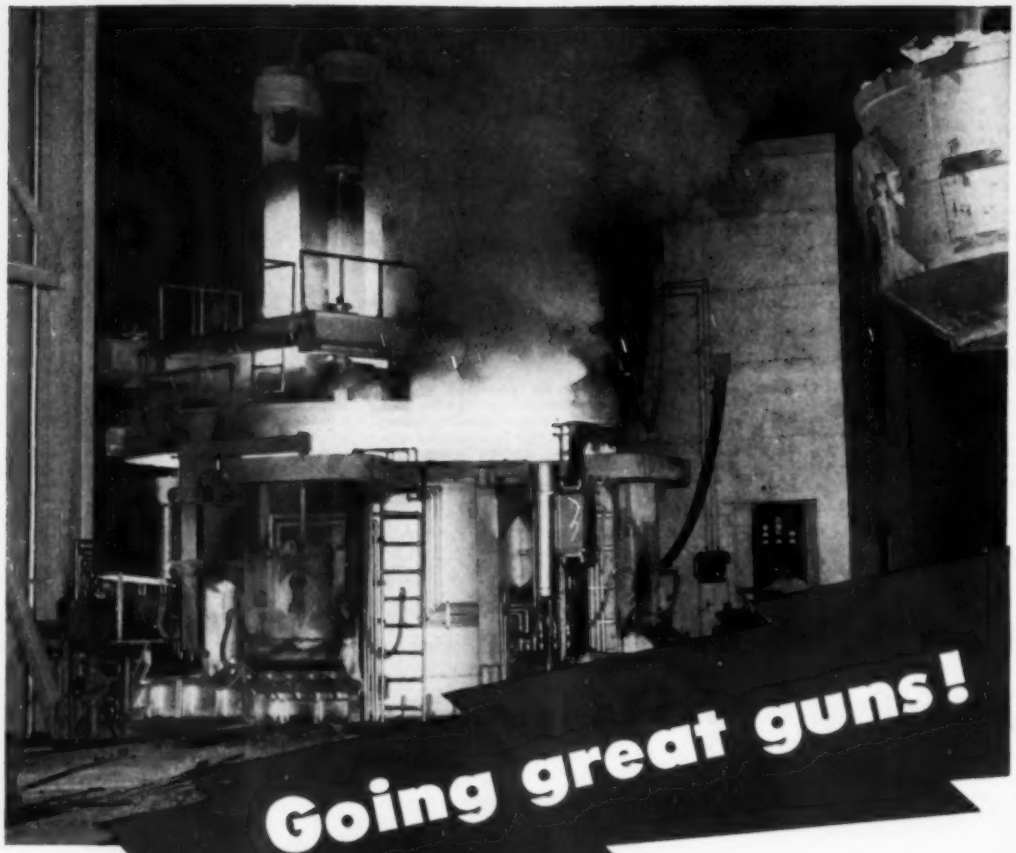
Address Childers Manufacturing Co., Dept. SP-4, 3620 W. 11th St., Houston 8, Texas.

Under CMP regulations, Childers is a Class B product, the use of which is not restricted.



Weather, wind and corrosive gases are not going to attack the insulation of this new plains-country gasoline plant. The insulation is protected by long-lasting aluminum: Childers Aluminum Weatherproof Jacketing. The management expects this low-cost jacketing to hold insulation maintenance costs to a minimum. Other advantages are that the jacketing went on quick and easy during construction; it required no special tools or skill—no shop forming or cutting. It can be taken off and re-used if lines are moved. Aluminum saves on painting and the tough 35 alloy used for Childers Jacketing should stand up for years even in highly corrosive industrial atmospheres. Check the advantages of this jacketing for your own plant.

Amazingly easy to handle, Childers Jacketing was applied here by men using no more than a wooden wedge and a pair of pliers. Childers has engineering representatives in every major industrial center who will be glad to confer with you on your particular jacketing problems. Write to address shown above.



Going great guns!

DIXISTEEL'S NEW ELECTRIC FURNACE MEANS MORE STEEL FOR THE SOUTH

The Southeast's largest electric furnace went into action on May 13. It is now going great guns, turning out steel for defense and civilian needs throughout the South.

This modern 60-ton electric giant has already made a complete heat in less than three hours. Its speed and efficiency make it possible for this one furnace to produce half as much steel as our three open hearth furnaces, and thus increase our total annual output by more than 50 percent.

Now more steel, and products of steel, will bear the name DIXISTEEL.

DIXISTEEL

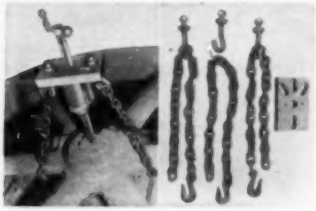
ATLANTIC STEEL COMPANY • ATLANTA, GEORGIA

new equipment (*continued*)

(*Starts on page 8*)

Two & Three-Way Chain Puller

K-7 OWATONNA TOOL COMPANY, 395 Cedar St., Owatonna, Minn., has introduced a new chain puller built especially for use with the company's 17½-ton hydraulic ram.



Owatonna Tool Company's two and three-way chain puller for use with OTC Power-Twin Hydraulic Ram.

The device operates both as a two-way and three-way puller and comes equipped with 3 ft, 3720 pound proof test ⅜-in. chain with a grab hook on one end. Self centering hooks with a screw adjustment permit a straight, even pull without cocking.

Acetylene-Air Gas Torch

K-8 VELOCITY POWER TOOL COMPANY, 7505 Thomas Blvd., Pittsburgh 8, Pa., has introduced a new automatic acetylene-air gas torch.

Velocity Power Tool Company's 12 oz Torch-O-Matic lights at the squeeze of a trigger and shuts off upon release.

It is said to be a versatile and handy tool in utility or power plant for intermittent or "on-again, off-again" soldering and brazing such as

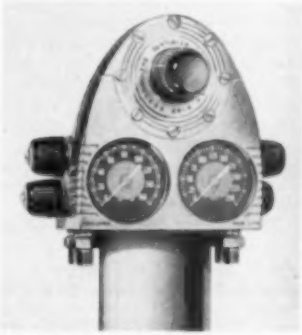
For more data circle item code number on the postage free post card—p. 17

in repair and maintenance of machinery and equipment, at construction sites, and for emergency lighting.

Squeezing the spring-loaded trigger simultaneously opens the torch gas valve and sparks the heavy-duty flint for ignition. Trigger also can be locked open for continuous flame. One-hand operation makes for better user comfort and efficiency.

Air Transformer

K-9 THE DEVILBISS COMPANY, 300 Phillips Avenue, Toledo, Ohio, announce their new HLD Air Transformer, described as being more efficient, easier operating, sturdier constructed and having a greater capacity.



Oil and moisture is eliminated by the *DeVilbiss Company* transformer which traps the liquids and delivers clean air to all outlets. In tests, 97 per cent of entrained water was removed from 100 cfm of air at 100 lb pressure.

Unit has a built-in two-stage regulating principle which provides for easier adjustment of pressures, requiring only finger tip control of the adjusting knob. Latter actuates a small pilot regulator which in turn operates the diaphragm of the large regulator, thus giving ease of operation.

Transformer, with a capacity of 100 cfm, has two regulated air outlets and two unregulated. Oil and moisture captured in the condenser tube is easily drained by a pull-push drain knob. Pulling the knob down closes the drain and pushing it up opens it.

Electrically Heated Valves

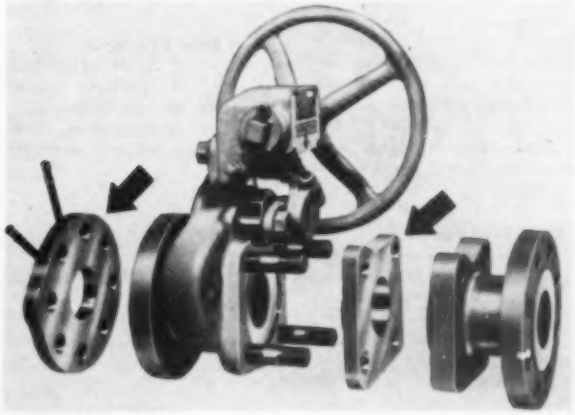
K-10 OKADEE COMPANY, 332 S. Michigan Ave., Chicago, announces availability of electrically-heated valves, designed to keep valve mechanisms clear of frost and ice in liquid carbon dioxide lines at temperatures as low as —110 deg F.

Many other applications are being developed which include both hot, cold and viscous liquid and gas lines, as well as uses where heated valves have heretofore been economically impractical.

All heated valve sizes from 2 in. to 6 in. are available, with pneumatic, hydraulic, solenoid or manual control. Heating elements can be provided for either 110 or 220 volt operation, with inputs ranging from 400 to 3000 watts per unit. Heated valves for use in hazardous atmospheres will be offered soon.

Where flanged type Okadee valves are now in service, heating elements may be installed by simply exchanging standard studs for studs one inch longer.

Single-disc *Okadee Company* valves require the heating element at the right. Double-disc valves can be equipped with both elements illustrated.

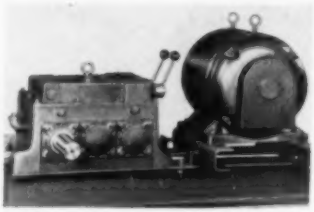


For more data circle item code number on the postage free post card—p. 17

Multi-Speed Transmissions for Heavier Hp Applications

K-11 THE TURNER MACHINERY COMPANY, 3435 Terrace St., Kansas City, Mo., announces three new models of multi-speed power units for heavier horsepower applications.

The models are available in ratings up to 60 hp, thus making them adaptable to a wide range of heavier applications. The units are ideal for use wherever it is necessary to vary the turning speed of electrically-driven equipment or machinery. Many installations are in connection with internal-combustion engines where it is advantageous to run the engine at a constant speed and vary the output speed with the Turner multi-speed transmission.



Multi-speed power units of the *Turner Machinery Company* are available in ratings up to 60 hp.

While all of the transmissions are available in four speeds, with a selection of different speed ratios, some models can be supplied with six and nine speeds.

A practical feature is the availability of two different type mounting brackets. The type RMB is a vertical mounted arrangement with the motor mounted on a hinged plate directly over the transmission. Type H-Beam mounting is the motor mounted in front of or behind the transmission. The motor slide rails on the H-Beam have both lateral and longitudinal adjustment to accommodate different motor frames and belt take-up. Output shaft can be left or right, forward or rear.

New Model Oil Burners

K-12 CLEAVER-BROOKS COMPANY, 326 East Keefe Ave., Milwaukee 12, Wis., has introduced two new models to its complete line of industrial and commercial burners.

The new burners will be known as

This *Cleaver-Brooks Co.* model AM6-H burner is shown at high fire stage. It does not start at full capacity, but begins with a small flame that builds up to required size, thus assuring smooth ignition, preventing puff backs even with poor draft conditions.

the AM5-H and the AM6-H models. The AM5-H, which has a capacity of 25 gph, has an overall width of 20 in. instead of 31 in., enabling more practical side-by-side installations. Height of the center of the combustion cone to the floor is 8½ ft instead of 11 ft, making it unnecessary to pit in front of the boiler on most jobs. A switch panel box is included on the new model burner.

Oil tubing in the new model is simpler, neater and more convenient. The relay and motor starter are mounted in the switch panel box.

A convenient feature is a separate tank to hold the oil used to lubricate the air pump. Power losses and lack of air due to belt slippage are averted by use of a direct connected pancake motor. Use of an electronic relay provides safe flame failure protection.

The AM6-H, with a maximum capacity of 40 gph, uses virtually the same casting as the AM5-H, with only these differences . . . the AM6-H has a three horsepower instead of a two horsepower motor. It also uses a larger oil pump. The AM6-H has a larger dry oven and a larger air diffuser.

Installation and operation of these two burners are simple and efficient.

Flow Rate Regulator

K-13 W. A. KATES CO., Deerfield, Ill., announce recent modifications in their direct-acting flow rate regulator to provide greater accuracy and improved performance on liquid flow control problems.

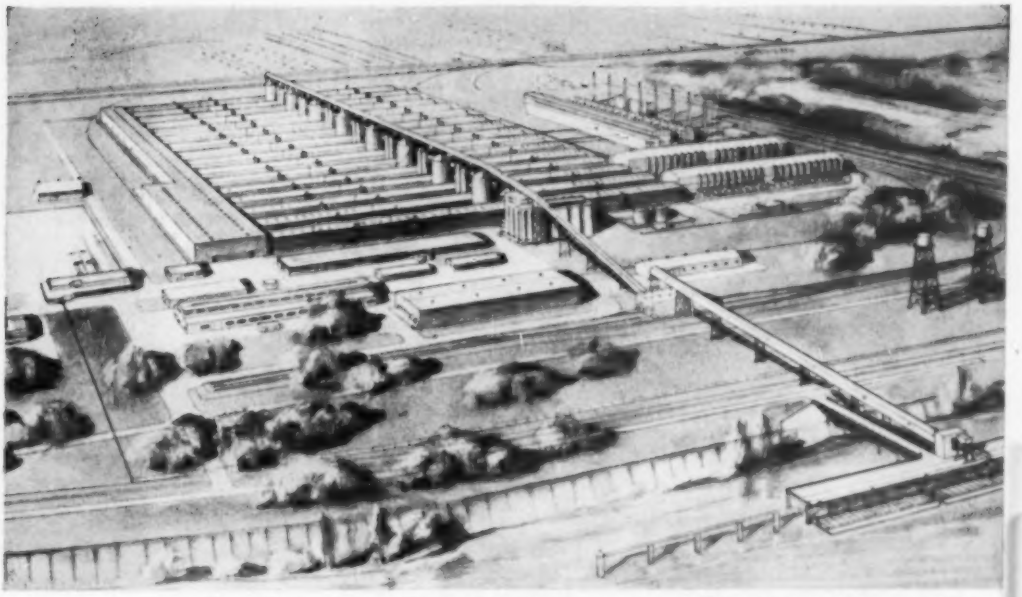
Designed for use wherever liquids are handled, the new regulator is particularly well-adapted to such jobs as blending and proportioning, solvent extraction, controlling filter effluent, water treatment and deionizing, chemical process control, evaporator influx, diluting of bulk heavy chemicals, and on many other jobs where accurate control of flow rate has resulted in a better product, increased economy, and smoother production schedules.

Standard capacities of *W. A. Kates Company's* flow rate regulators range from 0.1 to 100 gpm of water.

Operation of this low-cost regulator is simple and trouble-free. Just set the calibrated dial to the desired flow rate and despite pressure fluctuations in either the inlet or outlet lines, the regulator automatically holds flow to the set rate. When combined with a centrifugal pump, a Kates regulator will give proportioning control equal to that of much more costly equipment. Action of the regulator is quick and positive, without the hunting or time lags normally associated with elaborate systems.

Available with standard capacities ranging from 0.1 to 100 gpm of water, all Kates regulators are accurate to within +3%. When desired, larger capacities and greater accuracy can be furnished. Installation requires no special tools, and can be made quickly.

Free additional information is available to readers of Southern Power & Industry. Check item number on the postage free service coupon post card—page 17.



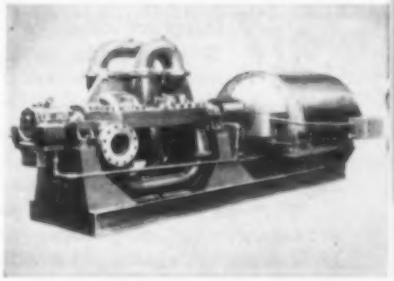
KAISER ALUMINUM AND CHEMICAL CORPORATION'S new 400,000,000 pound-a-year, $150,000,000 aluminum reduction plant at Chalmette, La., designed and built by Kaiser Engineers, is the largest plant of its kind in the U. S. The plant—where production began in December, 1951—uses 19 Worthington boiler-feed pumps and other Worthington equipment including thirty 9,300 square-foot condensers, and fifteen 250,000 pound-per-hour deaerators, 2 steam turbines and numerous circulating pumps.

Power plant at largest aluminum reduction plant to use Worthington pumps, condensers, deaerators

It takes plenty of electric power to produce 400,000,000 pounds of aluminum in a year. And that's what they're doing at the new Kaiser Aluminum plant at Chalmette, La.—largest aluminum reduction plant in the U. S.

Kaiser joins many other top companies in choosing Worthington boiler-feed pumps as well as other key equipment for their new plant. Such choices arise out of an insistence for equipment that's engineered for maximum performance.

Worthington engineering produces boiler-feed pumps of the most advanced design in the field, made from specially selected metals. Each pump is exactly *right* for the pressure and temperature with which it is to perform. Over 110 years of Worthington experience in building pumping equipment go into making this a certainty. Worthington Corporation, formerly Worthington Pump & Machinery Corporation, Centrifugal Pump Division, Harrison, New Jersey. C-2.4

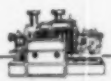


19 WORTHINGTON 250,000 LBS PER HR BOILER-FEED PUMPS at new Kaiser plant, handle feedwater at 257 F against a discharge pressure of 1,030 psig. Pumps are axial-balanced, volute type centrifugals. Two, similar to one illustrated, are driven by Worthington 450-hp steam turbines.

For Boiler Feed Service. Capacities to 1,500 GPM; Heads to 1,000 feet.

For Hotwell, Condensate, Chilled Water Service. Capacities to 1,400 GPM; Heads to 650 feet.

For Water Works, Circulation, Drainage, General Service. Capacities to 135,000 GPM; Heads to 400 feet.



For Boiler Feed Service. Capacities to 3,000 GPM; Heads to 7,000 feet.

The World's Broadest Line Assures You the Right Pump for Every Job

WORTHINGTON

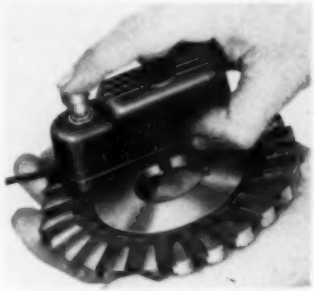
Centrifugal Pumps

new equipment (continued)

For more data circle item code number on the postage free post card—p. 17

Portable De-Magnetizer

K-14 ENCO MANUFACTURING COMPANY, 4520 W. Fullerton Ave., Chicago 39, Illinois, has introduced a new portable instrument which thoroughly de-magnitizes tools, dies, parts, pieces, etc., by merely sliding it over the surface of the item to be de-magnetized.



Note the small size of this Enco de-magnetizer—1¼ in. wide, 4 in. long, and 1⅝ in. high.

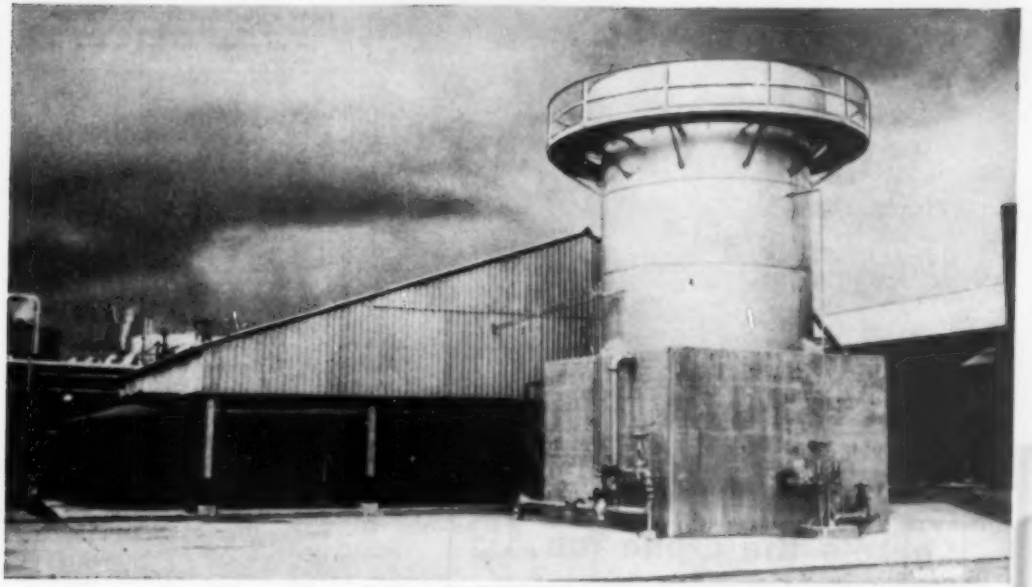
"Miti-Mite" De-Magnetizer No. 500 consists of a base in the form of a small block, and an extension cord. The base is made of non-breakable molded plastic. On top of and toward the front of the base, in an offset, is a single pole momentary action switch which is normally open. In the bottom of the base are three poles of laminated silicon steel, flush with the bottom surface.

In use, the instrument is plugged into any 110 a-c outlet. It is then placed on top of the part to be de-magnetized, the action switch pressed and the device moved slowly over the surface of the part. By pressing the switch, the current is closed, setting up a field of flux which neutralizes magnetism. Releasing the switch automatically shuts off the unit. It is therefore impossible accidentally to leave the current on and burn out coils.

Automatic Package Boiler

K-15 ORR & SEMBOWER, INC., Morgantown Road, Reading, Pa., have introduced an automatic packaged steam generator, having the horizontal fire-tube boiler as its basic component.

Its three-pass internal furnace construction is one reason for the unit's high efficiency and economical operation. Voriflow burners for light oil, heavy oil, and commercial gas fuels



SPECIALLY DESIGNED 500 GPM WORTHINGTON TREATING SYSTEM at the new Pemex natural gas refinery in Poza Rica, Mexico. System includes cold-process slurry-type softener followed by acid feed, filtration and zeolite treatment. Engineered by Arthur G. McKee Company.

Specially Designed for Intermittent Service

Softening system for boiler feed water built for short-period operation, long shutdowns

Water conditioning requirements are especially tough at the new Pemex natural gas refinery in Poza Rica, Mexico.

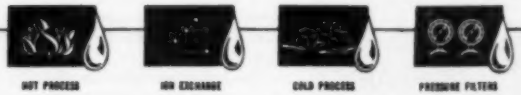
Their need for variable-rate, continuous-service softener operation is complicated by the intermittent boiler feed-water storage demands.

Pemex's conditioning requirements have been met by a specially built Worthington system, so designed that the slurry bed is not lost during "off-service" periods. The bed resumes its normal suspended position at the instant service is resumed. This avoids the irregular treatment, delay and water waste common in systems that require creation of a new slurry bed after each shutdown period.

New Bulletin W-212-B5 gives you the vital facts about this unique cold process water softening method. Write for your free copy today.

Worthington engineers and builds equipment for all the major types of water-conditioning systems, therefore is in an excellent position to give comprehensive and well-balanced recommendations on your water-conditioning equipment problems . . . further proof that *there's more worth in Worthington*. Worthington Corporation, Water Treating Section, Harrison, N. J.

A1.3



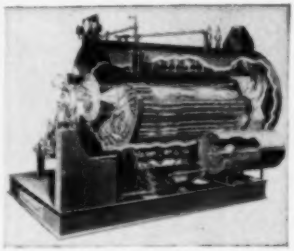
Worthington Makes More of the Equipment for ALL Types of Water Conditioning Systems

WORTHINGTON

Water Conditioning

new equipment (continued)

For more data circle item code number on the postage free post card—p. 17



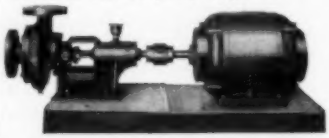
Orr and Sembower Powermaster boilers are built in 16 sizes from 15 hp to 500 hp for pressures up to 250 psi.

as well as dual combination burners modulate with uniformly high efficiency.

Combustion gases travel through the central combustion tube, reversing their flow back through the lower bank of tubes, then again toward the rear branching through two lateral banks of tubes. Front and rear covers are readily removable for inspection. The cylindrical combustion chamber assures complete combustion within the furnace. The boiler feed and condensate handling system is optional. A completely integrated control system and interlocking safety devices are an integral part of each unit.

Chemical Service Pump

K-16 WARREN STEAM PUMP CO., INC., Warren, Mass., has introduced the improved Warren-Quimby process and medium duty chemical service pump Type "G."



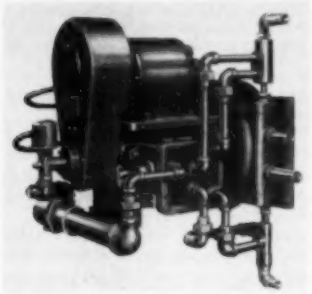
Warren Steam Pump Company's service pump available in 1, 1¼, 1½, 2, and 3 in. sizes up to 400 gpm heads to 240 ft.

The manufacturer recommends it for circulating and transfer service for various process and chemical liquids; filter press service; condensate return and low pressure boiler feed service; handling slurries and other liquids containing moderate quantities of small solids in suspension.

The pump features simplicity of design, sturdy bearings, extra deep stuffing box, tapped catchall, together with strong construction.

Conversion — Replacement Burners Now Available

K-17 SUPERIOR COMBUSTION INDUSTRIES, INC., 1475 Broadway, New York 18, N. Y., recently announced that their line of rotary burners originally manufactured exclusively for use with the company's steam generators, are now available for conversion and replacement use as well as for new installations in the commercial and industrial fields. The burners, of the horizontal-rotary design, were developed primarily to achieve the complete combustion which results in highest efficiencies with greatest economy of



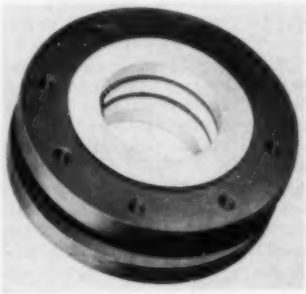
Superior Combustion's Rotary Burner for fully automatic operation with No. 6 oil. Burners are fully automatic in sizes to 500 bhp with dual ignition and hi-low or fully modulating control.

fuel. Among important features listed by the manufacturer to provide dependable, automatic operation, precise control of firing rates, more accurate control of flame contour, and minimum upkeep, are time-tested horizontal-rotary design; V-belt drive for the high cup speed essential to efficient atomization; four-hole hinge circulates oil through oil heater so that oil is on the pressure side of the pump, allowing you to burn oil at higher temperatures; adjustable air nozzle provides accurate control of flame contour; dual pumps and reservoir combined with constant oil rate control provide controlled firing regardless of viscosity variation; burn any grade of oil, also available with combined gas burner for any type of gas.

Flexible Coupling Design

K-18 THE UNITED STATES GASKET COMPANY, Fluorocarbon Products Division, Camden, N. J., have announced a new adaptation of the "Teflon" bellows as

new equipment (continued)



The Chemiseal Flexible Coupling for chemical resistant piping and equipment is made from Teflon, impervious to all chemicals except molten sodium and fluorine.

used in their expansion joints, widely used in chemical piping.

The flexible coupling is composed of a bellows with only two convolutions, assembled with flanges of either cast iron, aluminum or special metals, and embodying integral gaskets.

These flexible couplings are suitable for connection to any of the major manufacturers' flanged-end designs of piping. Not only are these units suitable for joining piping of equal material, but also for joining such materials as Pyrex piping to glass-lined steel, and glass-lined steel tube to Karbate, Haveg and steel pipe. These couplings also make the use of adapters unnecessary, eliminating the need for slip joints, and taking the place of gaskets at the point of use.

The couplings are advantageous in absorbing vibration between pumps and piping; to compensate for slight misalignments of piping and equipment outlets; to accommodate slight movement of piping when connecting to scale tanks and weighing devices; to absorb a minimum degree of axial thermal expansion.

Airfoil Centrifugal Fan

K-19 WESTINGHOUSE ELECTRIC CORPORATION, STURTEVANT DIVISION, 200 Readville St., Hyde Park, Boston 36, Mass., announces a new type non-overloading, centrifugal fan that is said to be over 90 per cent efficient with only ⅓ of the noise intensity of the company's previous models.

The new fan, designed especially for industrial and power plant needs, ranges in wheel sizes from 40¼ in.

BLAW-KNOX POWER PIPING used in *INDIA'S FIRST* high-pressure, high-temperature power plant

In the far-off corners of the world—the Philippines, South America and other foreign countries—you will find Blaw-Knox prefabricated power piping. One of the latest is at Bokaro, India, 200 miles northwest of Calcutta, where Blaw-Knox is shipping about 1½ million pounds of power piping for the Bokaro Steam Power Plant. Contractors appreciate Blaw-Knox experience and accuracy when ordering power piping for distant lands . . . they can be sure of trouble-free installation even with unskilled labor. Whether your installation is here or abroad it will pay you to consult Blaw-Knox.

CONTRACTOR: The Kuljian Corporation of Philadelphia. To be operated by the Damodar Valley Corporation.

•

Blaw-Knox Power Piping used throughout. Sections of main steam leads shown at right are fabricated of chrome-moly steel. Lead at right of photograph is 14" diameter; the other three are 10" diameter. Total length of each lead is over 30'.

•

To facilitate installation in the field the piping for the high pressure lines was made with flanged joints.

•

Steam is carried at 975 psi and 950°F.

•

To assure safe transportation of finished sections, Blaw-Knox outlined railroad clearances on large-scale drawings before beginning fabrications.

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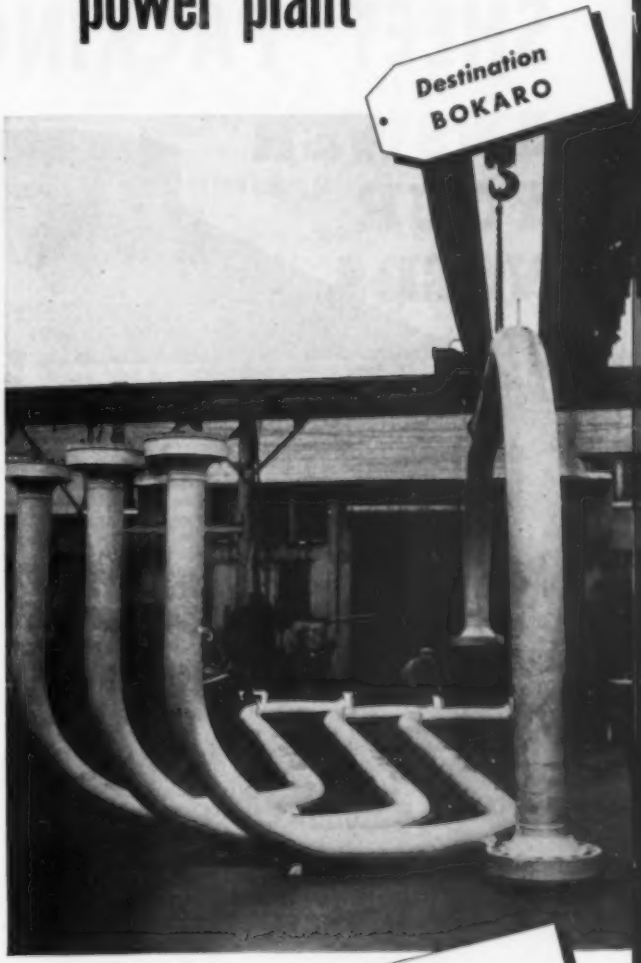
This is the first high-pressure, high-temperature steam power plant to be built in India and will provide power for industrial expansion in the Damodar Valley area.



BLAW-KNOX CONSTRUCTION COMPANY

1525 Pennsylvania Avenue, Pittsburgh 33, Pa.

POWER PIPING AND SPRINKLER DIVISION

new equipment (continued)

to 108¾ in. diameter and is capable of delivering volumes up to 600,000 cfm.

The new airfoil blade design, along with simultaneous aero-dynamic changes in inlet and casing, has boosted mechanical efficiency at peak to 92 per cent, an increase of eight percentage points over current designs. There has also been a reduction of five decibels in the noise intensity level.

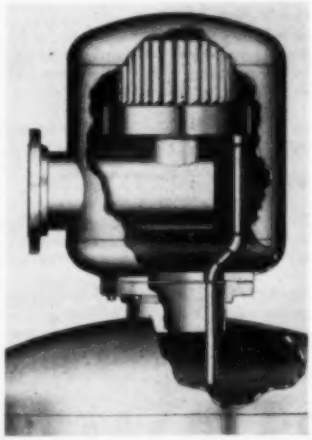
Internal Downflow Purifiers Clean Steam & Other Vapors

K-20

THE V. D. ANDERSON COMPANY, 1935 West 96th St., Cleveland 2, Ohio, announces the development of Internal Downflow Hi-eF Purifiers for numerous industrial applications.

Dirt, moisture, riser discharge and solids are removed before passing on to the distribution piping when this new internal downflow purifier is installed in an auxiliary tank immediately above evaporators, packed towers, deodorizers, stills, bubble-cap towers and inside steam drums, flash tanks, receivers and other vessels.

A unique feature of these units is the separating element designed so that the units maintain a constant separating efficiency even as velocities become greater. Removal of foreign matter is accomplished by means of a multi-stage centrifugal element which engages the entrainment laden vapor at the inlet at the top of the



Although this *V. D. Anderson* purifier is designed for downflow service, upflow units are available in outlet sizes 4 to 24 in. furnished with slip joint connections or can be threaded in sizes 4 through 10 in.

purifier as far away from the liquid level in the drum as possible. In three stages by means of carefully controlled centrifugal force practically all dirt, moisture and riser discharges are removed. The cleaned stream is then passed on through the outlet of the vessel, while foreign matter is discharged to a drain. The design is such that there is no critical pressure drop through the unit.

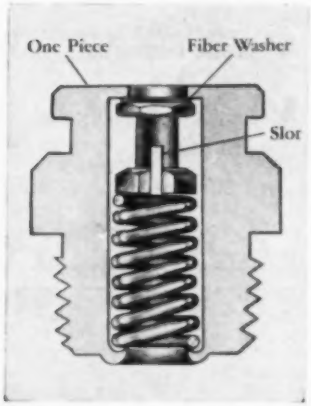
According to the manufacturer, the purifiers increase heating efficiency and protect pipeline equipment in steam application; in chemical and petroleum vessels they recover valuable vapors; they increase production in evaporator operation; and in food processing produce a better product.

Buttonhead Grease Fitting

K-21 UNIVERSAL LUBRICATING SYSTEMS, INC., Oakmont, Pa., is now manufacturing a new giant buttonhead grease fitting with one-piece construction for use on all heavy industrial machinery.

Employing a design new to the field, the giant buttonhead fitting is built to provide maximum grease flow. It prevents the leaking possible with conventional two-piece buttonhead fittings which can be separated by extreme pressure or jolting. One-piece construction imports stronger, longer-wearing, abuse-resisting qualities, according to Universal tests. The new product also features a strong steel inner-spring which combines with a fiber sealing washer to prevent grease leak-back.

The company offers a complete line of its new giant buttonhead fittings in all regular sizes.



Universal Lubricating Systems' one-piece design prevents the leaking possible with conventional two-piece buttonhead fittings.

No Leakage
No Lubrication

That's why Ingersoll-Rand's advanced design

DMV and DHV PUMPS

can end your maintenance problems in general hydraulic service

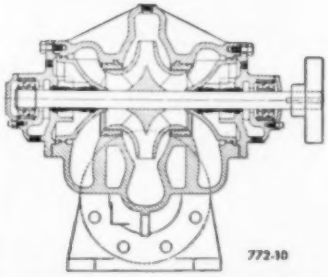
SINGLE-STAGE
DOUBLE-SUCTION
HEADS TO 340 FT.
CAPACITIES TO 2100 GPM
TEMPERATURES TO 200° F.

- **Extra Protection Against Shaft Leakage** through use of efficient *double* shaft seals in place of usual, packed stuffing boxes.
- **Double Shaft Seals** end stuffing box maintenance.
- **Longer Seal Life** assured with *double* shaft seals. Clean sealing water is injected to protect sealing surfaces when pumping gritty liquids.
- **Sealed, Cartridge-Type Bearings** require no lubrication throughout their service life.

These advanced design features make the DMV line the simplest and most maintenance-free single-stage double-suction pumps ever developed by Ingersoll-Rand for general hydraulic service. Ask your nearest I-R representative for complete information on this latest pumping development.

✔ **Double Mechanical Shaft Seals**

✔ **Permanently Lubricated Ball Bearings**



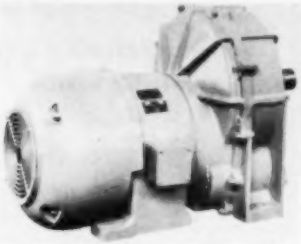
772-10

Ingersoll-Rand
Cameron Pump Division
11 Broadway, New York 4, N. Y.

COMPRESSORS • PUMPS • AIR AND ELECTRICAL TOOLS • VACUUM EQUIPMENT • ROCK DRILLS • CONDENSERS • GAS AND DIESEL ENGINES

Geared Electric Drive for Heavy Duty Applications

K-22 STERLING ELECTRIC MOTORS, INC., 5401 Anaheim—Telegraph Rd., Los Angeles 22, Calif., announce the addition of larger totally enclosed fan-cooled geared motors to their line of Slo-Speed electric power drives.



These new units by *Sterling Electric Motors* are double reduction and available with Class I, II and III gears in frame size 364/365, and AGMA speed 155 rpm and slower in rating from 5 to 25 hp.

In this drive bearings are mounted in the outer walls of the gear case and gears are mounted between these widely spaced bearings, permitting use of offset shafts and providing permanent bearing and gear alignment in uniform distribution of load.

Corrosion resisting grey iron housing, labyrinth seals, large safe terminal boxes and rugged helical gears make these geared motors well suited for low-speed drives where maximum protection is required against non-explosive liquids, dust or vapors.

Books for the Plant Engineer

Handbook of Engineering Fundamentals

PUBLISHED BY
JOHN WILEY & SONS, INC.
440 Fourth Ave., New York 16, N. Y.
14 sections
Price, $10.00

This second edition of the "Handbook of Engineering Fundamentals" gives additional and revised data. Subjects covered include: Mathematical and Physical Tables; Mathematics; Physical Units and Standards; Mechanics of Rigid Bodies; Mechanics of Deformable Bodies; Mechanics of Incompressible Fluids; Aerodynamics; Engineering Thermodynamics; Electricity and Magnetism; Radiaton, Light, and Acoustics; Chemistry; Metallic Materials; Non-Metallic Materials; and Engineering Law.

NEWS for the South and Southwest

Scott Tool Appoints Jenkins Sales Engineer in Tennessee

SCOTT MACHINE TOOL CO., 500 Piedmont Ave., N. E., Atlanta 5, Georgia, has announced the appointment of CHARLES M. JENKINS as Sales Engineer in Tennessee.

Charles M. Jenkins, with headquarters in Knoxville will represent *Scott Machine Tool Co.*, in Tennessee.

Mr. Jenkins is well known in Southeastern metalworking groups having been a past chairman of the Atlanta Chapter, American Society of Tool Engineers and a charter member of the Georgia Chapter, American Society for Metals.

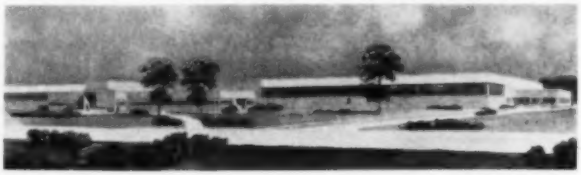
He is a mechanical engineering graduate of Georgia Tech and has received wide engineering experience with the Budd Manufacturing Company of Philadelphia, and Walker Electric Company of Atlanta. For the past ten years he has been foreman of the Westinghouse Manufacturing and Repair Shops in Atlanta.

Scott Machine Tool Co. represents Colonial Broach, Fosdick Machine Tool, Kearney & Trecker, Michigan Tool, Rockford Machine Tool, Sidney Machine Tool, Walker-Turner, Ace Drill, Colonial Bushings, Cone-Drive Gears, Detroit Cap & Tool, New Method Steel Stamps, Tungsten Carbide Tool, Weldon Tool, Wetmore Reamer, and Producto Die Sets in the states of Tennessee, Georgia and Florida.

Hill-Chase, Roanoke, Va.

THE HILL-CHASE STEEL COMPANY OF MARYLAND, 6501 Erdman Avenue, BALTIMORE, MD., has announced the appointment of E. C. SANDERS, as sales representative in ROANOKE, VIRGINIA.

Mr. Sanders will handle the firm's steel and aluminum products in parts of VIRGINIA, NORTH CAROLINA, TENNESSEE and KENTUCKY.



Chicago Pneumatic's Fort Worth, Texas, Plant Now Scheduled for Completion in Early 1953

The new 130,000 sq ft Forth Worth, Texas, plant of the CHICAGO PNEUMATIC TOOL COMPANY will serve as headquarters and manufacturing center for the company's complete line of oil tool products. Three-cone bits, drill collars, tool joints, reaming bits and reamers, rotary subs and junk baskets have been manufactured in the company's plant at Franklin, Penna.

Construction began in June with Walter Kidde Constructors, engineers and builders of New York and Houston, in charge of the design and construction program. Cost is estimated at $4,500,000 to construct and equip.

Chicago Pneumatic is now celebrating its 50th Anniversary as manufacturers of air compressors, portable pneumatic and electric tools, rock drills, and gas and diesel engines. The company manufactures over 2000 types of tools and power generating equipment.

Other expansion activity in the South and Southwest includes a new District Sales Office at 91 16th St. N.W., Atlanta, Georgia. R. B. MILLER is District Manager, serving North Carolina, South Carolina, Eastern Tennessee, Georgia, Florida, Alabama, Mississippi, and Louisiana sales territory.

FUTURE EVENTS
Of Engineering Interest

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, C. E. Davies, Sec'y, 29 West 39th St., New York 18, N. Y.
Sept. 8-11, Fall Meeting, Sheraton Hotel, Chicago, Ill.
Sept. 8-12, Industrial Instruments & Regulators Division and Instrument Society of America Exhibit & Joint Conference, Auditorium, Cleveland, Ohio
Sept. 22-24, Petroleum Mechanical Engineering Conference, Hotel President, Kansas City, Mo.
Oct. 30-31, Fuels and AIME Coal Divisions Joint Conference, Bellevue-Stratford Hotel, Philadelphia, Pa.
Nov. 30-Dec. 5, Annual Meeting, Statler Hotel, New York, N. Y.

AIR POLLUTION & SMOKE PREVENTION ASSOCIATION OF AMERICA, R. W. Bourne, Ch. Engr., Louisville Air Pollution Control Commission, 304 City Hall, Louisville, Ky.
Sept. 18-19, East Central Section Meeting, Kentucky Hotel, Louisville, Ky.

NATIONAL ASSOCIATION OF CORROSION ENGINEERS, John E. Loeffler, Program Chmn., 1061 M & M Bldg., Houston 2, Texas
Oct. 1-3, South Central Regional Meeting, Jung Hotel, New Orleans, La.

SOCIETY OF INDUSTRIAL PACKAGING & MATERIALS HANDLING ENGINEERS, C. J. Carney, Jr., Mgng. Dir., 20 W. Jackson Blvd., Chicago 4, Ill.
Oct. 13-16, Seventh Annual Industrial Packaging & Materials Handling Exposition, Coliseum, Chicago, Ill.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, H. H. Henline, Sec'y, 33 West 39th St., New York 18, N. Y.
Oct. 13-17, Fall General Meeting, New Orleans, La.

NATURAL GASOLINE ASSOCIATION OF AMERICA, Wm. F. Lowe, Sec'y, 422 Kennedy Bldg., Tulsa 3, Okla.
Oct. 19, Southern Regional Meeting, The Blackstone Hotel, Tyler, Texas

NATIONAL ASSOCIATION OF PURCHASING AGENTS, George R. Renard, Exec. Sec'y, 11 Park Place, New York 7, N. Y.
Oct. 19-21, 7th District, 9th Annual Conference of Purchasing Agents of the Southeast, J. R. Carmichael, Conference Program Chmn., Atlanta, Ga.

NATIONAL SAFETY COUNCIL, R. L. Forney, Gen. Sec'y, 425 N. Michigan Ave., Chicago 11, Ill.
Oct. 20-24, Fortieth National Safety Congress & Exposition, Chicago, Ill.

SOUTHWIDE CHEMICAL CONFERENCE, Prof. J. D. Capps, Chmn., Chemistry Dept., Alabama Polytechnic Institute, Auburn, Ala.
Oct. 23-24, 1952 Meeting, Auburn, Ala.

AMERICAN GAS ASSOCIATION, H. Carl Wolff, Mgng. Dir., 420 Lexington Ave., New York 17, N. Y.
Oct. 27-Nov. 1, Annual Convention, Auditorium, Atlantic City, N. J.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, Charles F. Roth, Mgr., Publicity Dept., 26th National Power Show, Grand Central Palace, New York 17, N. Y.
Dec. 1-6, Twentieth National Exposition of Power & Mechanical Engineering, Grand Central Palace, New York, N. Y.

For Intermediate and High Pressure Gas

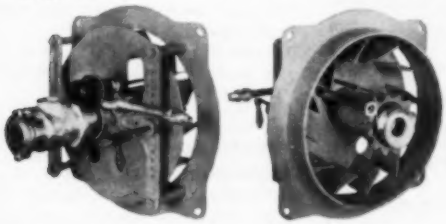
WEBSTER RECTILINEAR* Gas Burner

Now available after almost three years of operating tests and installations having capacity of 1,242,000,000 Btu/hr. at 10 psig.

This unique application of the *Venturi* principle has resulted in a high input burner that can be installed through *very* narrow rectangular furnace openings.

It is recommended for inter-tube firing; firing in a horizontal plane through small openings over coal grates; firing in a vertical plane on either side or on a horizontal plane over a stoker or oil burner; and also for use in all types drying kilns.

It is small in size, and light in weight, with excellent turn-down without flash back; stable flame retention even at high inputs—low noise level.



WEBSTER SERIES "R" Gas Burner

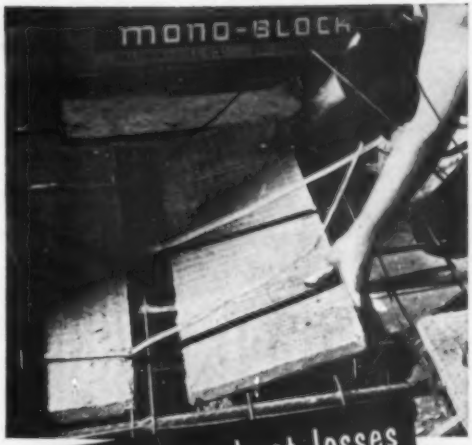
For High Pressure Gas with Combination Oil

When high pressure gas is available the 5 sizes of Series R Burners provide inputs from 2,000,000 Btu/hr/burner at 1 psi to 50,000,000 Btu/hr/burner at 10 psi.

There are practically no limits to the possible uses of the Series R assemblies except those imposed by the gas pressure available. It is most widely applied to high pressure boilers of 100 hp and above, steam generators of all types and refinery furnaces.

* TRADEMARK

The WEBSTER ENGINEERING COMPANY
TULSA, OKLAHOMA
Division of SURFACE COMBUSTION CORPORATION, Toledo, Ohio



even slight heat losses COST MORE than the insulation that prevents them.....

B-H MONO-BLOCK

This lightweight, rigid block insulation, effective up to 1700° F. eliminates the need for separate high and low temperature materials. Its low thermal conductivity helps maintain proper operating temperatures in steam boilers, refinery towers, ovens, chemical treating tanks and other hot equipment.

B-H Mono-Block is stable under severe heat and moisture conditions. And finished with B-H Powerhouse Cement (which also insulates) it provides long lasting insulation with permanent high efficiency. When heat losses have you worried, get in touch with B-H Engineered Insulation Service. No obligation at all.

Baldwin-Hill

Clip on signed letterhead and mail

TEAR OUT

BALDWIN-HILL COMPANY
601 Breunig Ave., Trenton 2, N.J.

Please send complete information on

- ☐ MONO-BLOCK ... Rigid, felted black rockwool block—for high and low temperature use
- ☐ POWERHOUSE CEMENT ... High adhesion, black rockwool insulating-finishing cement
- ☐ BLANKETS ... Metal-reinforced, flexible, felted black rockwool insulation
- ☐ NO. 1 INSULATING CEMENT ... All-purpose, rust-inhibiting plastic cement

news (continued)

Sheffield Steel—Houston

J. R. McALPIN, SHEFFIELD STEEL CORPORATION, sales executive and metallurgist, has been promoted to district sales manager in charge of the regional sales office serving HOUSTON and the Gulf Coast area.

Mr. McAlpin joined Sheffield in 1949. Previously, he had been with Crucible Steel at Midland, Mich., as a metallurgist and research specialist in charge of experimental work. He has also held executive sales positions with Baldwin Locomotive Works and Lone Star Steel.

Allis-Chalmers—Southwest

Newly named distributors for ALLIS-CHALMERS general machinery division are the EMSCO ELECTRIC SUPPLY CO., 611 W. Grand Ave., OKLAHOMA CITY; and the ELECTRICAL SUPPLY CORP., 421 Avenue L, LUBBOCK, TEXAS.

Emsco Electric is headed by O. H. ELLEDGE and its sales manager is T. W. CLINE.

The Electrical Supply Corp. has been appointed a distributor for Allis-Chalmers transformers in 14 northwest and northwest central counties in Texas, and in four east and southeast counties in New Mexico. G. C. WASSON is president; E. W. KARNES, vice president, and CLIFF ROBINSON, sales manager.

Midwest Piping & Supply Co. Enlarges St. Louis Plant

MIDWEST PIPING AND SUPPLY CO., INC., ST. LOUIS, MO., has just completed a large addition to the welding fittings manufacturing plant, according to an announcement by A. G. STOUGHTON, President.

The new addition adds 48,000 square feet of floor space and more than doubles the pressing and welding capacity. With equipment, the structure represents an investment of one-half million dollars.

Modern equipment for the precision manufacture of pipe welding fittings, has been placed in the new addition. Equipment is now complete except for a new press capable of producing welding elbows up to 36" pipe diameter. Midwest engineers have designed and Midwest shops are building this press, as they have all other special equipment employed in their five plants. It is hoped to have the new press in service before the year closes.

Executive Changes in Southern Company Group

J. F. CRIST, vice-president of THE SOUTHERN COMPANY, has been transferred to the BIRMINGHAM, ALA., office of that company. The transfer is in keeping with the Company policy of having its executives keep in close touch with the varied problems arising from the company's rapidly expanding operations.

T. H. VADEN, ALABAMA POWER COMPANY division manager at ANNISTON, has been elected a vice president of The Southern Company and has taken up his duties in ALANTA, GEORGIA, assisting C. B. MCMANUS, president.

E. C. GASTON, formerly in charge of design engineering, has been elected vice president and chief engineer of SOUTHERN SERVICES, INC., with offices at Birmingham.

Ashcroft Line Centennial

MANNING, MAXWELL & MOORE, INC., recently held a centennial celebration at its Stratford, Connecticut plant, in honor of the anniversary of its Ashcroft Pressure Gauge line of products.

The Ashcroft Manufacturing Company was the first business acquired by Manning, Maxwell & Moore, Inc. The company has plants in Stratford, Conn.; Watertown, Mass.; Jersey City, N. J.; Muskegon, Mich., and TULSA, OKLA.

Olin Industries—Shreveport

The FOREST PRODUCTS DIVISION with headquarters in SHREVEPORT, La., has been organized as the eighth operating division of OLIN INDUSTRIES.

The new division will be responsible for the operation of the properties and facilities of Olin Industries in ARKANSAS, LOUISIANA and TEXAS, acquired through merger with Frost Lumber Industries, Incorporated, in January, 1952.

JOHN W. HANES was appointed Vice President for Southern Operations with responsibility for administering the Forest Products Division, the Ecusta Paper Division and the Olin Cellophane Division.

F. T. WHITED, former President of Frost and now an Olin Director, was named Resident Director.

ROBERT H. EVANS was appointed General Manager of the new division, and has transferred his office from New York to The Commercial Building, Shreveport, La.

New Childers Representatives

THE CHILDERS MANUFACTURING COMPANY of HOUSTON, TEXAS, announces the appointment of new sales and engineering representatives for Childers Aluminum Weather-Proof Jacketing in Cleveland, Ohio, and Baltimore, Md. Childers Jacketing is a weatherproofing for outside insulated lines in power plants and all processing industries such as refineries and chemical plants.

THE W. M. ACKER ORGANIZATION, INC., 3167 Fulton Road, CLEVELAND, has been appointed to handle sales in the Cleveland territory.

JOBE & COMPANY, 344 East 33rd St., BALTIMORE, has been appointed to handle the sales in the Baltimore territory. Jobe & Company was formed three years ago and specializes in sales of valves and pumps to industrial plants, shipyards and government installations on the eastern seaboard.

Builders—Omega, Kansas City

Announcement of the opening of company offices in KANSAS CITY, MO., has been made by BUILDERS-PROVIDENCE, INC., and OMEGA MACHINE CO. The new office is located at Room 207, Congress Bldg., 3527 Broadway, Kansas City, Mo.

RAY W. LINDSEY heads the new mid-West office as Sales Manager. Mr. Lindsey has previously been a Sales Engineer in the Chicago Office of Builders and Omega.

Lacy Named P.A. for Sheffield-Houston

JAMES K. LACY, who managed Sheffield Steel's Washington office during World War II and several years after the war, has been appointed purchasing agent for the firm's Houston division.

Mr. Lacy joined Sheffield's sales department in Kansas City in 1941 after a number of years in banking and with the sales department of Phillips Petroleum Co. When war broke out, he was assigned to manage the Washington office and remained in charge there until November, 1945, when he was appointed manager of the important Chicago sales office.

In November, 1950, when the Korean war again placed the steel industry on a partial wartime basis, Mr. Lacy was sent back to Washington, where he managed the eastern division office until his appointment to handle purchasing for the Houston plant.

Worthington Corporation's Kansas City Offices

PAUL J. FOLEY has been appointed manager of the Kansas City office of the WORTHINGTON CORPORATION. He joined Worthington in 1937 after completing the Worthington Student Training Course. He then became a sales engineer in the company's Chicago office and later was made manager of its Milwaukee branch office. A graduate of Northeastern University, Mr. Foley is a member of the A.S.M.E. He succeeds W. R. Kennedy, who has been named a consultant to his successor.

Elliott Co.—Corpus Christi

GEORGE J. GREANEY, JR., has opened a new office for the ELLIOTT COMPANY at 731 Wilson Building, CORPUS CHRISTI, TEXAS. The company, which has headquarters at Jeannette, Pa., manufactures power plant, electrical, and industrial equipment. Mr. Greaney for the past four years has been a field engineer in Elliott Company's Houston office. He was born in Galveston, graduated as an electrical engineer from Texas A & M, and went to work for the Elliott Company right after graduation in 1947.

1953 Plant Maintenance Show

The Plant Maintenance Show, attended each year by top executives of virtually every industry, has been scheduled for the Public Auditorium in Cleveland in 1953, according to Clapp & Poliak, Inc., New York, which conducts the exposition. The dates are Jan. 19 to 22, inclusive.

The show, which developed from new management techniques in preventive maintenance, has risen in three years to one of the nation's foremost industrial expositions.

The 1953 show will be almost 75 per cent larger than its 1952 counterpart. Exhibits will cover a gross area of 110,000 sq ft. Compared to the first show in 1950, it will have almost four times as many exhibiting companies and cover about six times as much area. At least three companies, General Electric Co., Westinghouse Electric Corp. and Clark Equipment Co., each will have displays covering 3,000 sq ft. Three hundred and fifty other companies are expected to conduct exhibits.

The Plant Maintenance Conference, conducted by Clapp & Poliak during the first three days of the show, also will be held. The conference broke all attendance records for this type of gathering in Philadelphia earlier this year.

Briefs

What Your Leading Equipment And Supply Manufacturers Are Doing

M. E. ZIEGENHAGEN has been named Advertising and Sales Promotion manager of the WORTHINGTON CORPORATION, Harrison, N. J.; HERBERT J. MEEKER, Assistant to Vice President T. Cruthers has retired; and after forty-three years of continuous service, PAUL DISERENS, Director of Research and Development is retiring from his former responsibilities. Mr. Diserens will continue with the Corporation in a technical consulting capacity in engineering and research.

J. W. TORRANT has been appointed Sales Manager of the Industrial Division of THE DAYTON RUBBER COMPANY; L. J. ADAMS, Sales Promotion Manager of the Industrial Division; and W. H. WOOD, JR., Regional Sales Manager, Industrial Wholesalers Section, Southwest Region, with headquarters at Dallas, Texas.

Detroit's BULLDOG ELECTRIC PRODUCTS COMPANY is celebrating its 50th year in the manufacture of industrial electrical equipment. The company's program of product simplification took industrial electrical distributon systems out of the custom-bult class and made possible assembly from completely pre-fabricated and standardized parts.

LESTER A. SHEA, on leave of absence as General Sales Manager of LINDBERG ENGINEERING COMPANY, Chicago, Illinois, has been selected Chief, Industrial Heating Equipment Section, Metalworking Equipment Division of the National Production Authority, Washington, D. C.

R. S. STEVENSON, formerly Vice President and General Sales Manager of the Tractor Division, has been elected Executive Vice President of the Allis-Chalmers Manufacturing Co.

THE BAKER-RAULANG COMPANY, has announced the appointment of HUGH C. SEELEY to the position of Sales-Service Supervisor and WALTER E. SCHOCH as Service Department Manager.

GERARD E. NISTAL has been appointed Advertising and Sales Promotion Manager for the Government and Industrial Division of the PHILCO CORPORATION.

AMBROSE C. MILLER, formerly with the Philco Corporation in Philadel-

phia, has joined THE WILLIAM BRAND COMPANY, Willimantic, Connecticut, as Product Engineer. The company manufacturers electrical insulating materials, varnished tubing, varnished cambric markers and insulated wire.

O. D. METZ of THE EMERSON ELECTRIC MFG. CO., St. Louis, Mo., has assumed the duties of Manager of Motor Sales, succeeding WILLIAM R. FRASER, who has retired. W. H. THIAS has been appointed Assistant Manager of Motor Sales.

St. Louis Plant of Ryerson Steel

Some 2600 customers, friends, and well-wishers recently visited the St. Louis plant, 5 Clinton Street, of JOSEPH T. RYERSON & SON, INC., steel distributor, when the company held Open House in celebration of the completion of a large addition to its steel service facilities.

John M. Acee, plant manager, was host at the big affair. Company officials on hand to welcome guests included included C. L. Hardy, president, Harold B. Ressler, chairman of the executive committee, who first managed the St. Louis plant from 1914 to 1929, Ainslie Y. Sawyer, William Seymour, Jr., and T. Z. Hayward, vice presidents, and T. G. Miller, secretary. A. M. Ryerson, a director of the company, and R. C. Ross, former vice president and now retired, also attended.

The addition to the plant which prompted the Open House celebration was begun in March, 1951. It consists of three spans, all heated and completely crane served, providing 50,000 sq ft of additional warehouse space. Total plant and office space of the enlarged plant is now approximately 161,000 sq ft.

The new space is used for sheet steel warehousing and cutting facilities, and for stocking alloy and stainless steels including special aircraft alloys and stainless steel used by the firm's customers who are doing defense work.

New equipment now in operation includes a 200 hp high speed friction saw, the most powerful in any steel warehouse between Chicago and the West Coast, a fast cutting plate shear equipped with special handling devices, and an electric eye plate burning machine. The latter machine, the first to be installed in a steel warehouse in this area, permits more complicated and intricate plate cutting for defense work as well as to take care of essential civilian requirements. New hack saws, scales, racks and other fixtures complete the equipment modernization program.

Mason of Georgia Tech on Leave to du Pont

DR. JESSE W. MASON, Dean of Engineering at the Georgia Institute of Technology, has been granted a year's leave-of-absence in order to participate in the Educator in Industry Program of the E. I. du Pont de Nemours & Co., Wilmington, Del.

Dr. Mason is one of the first educators to be selected by E. I. du Pont de Nemours & Co. for this new program of cooperative exchange of educators with that industry, and was chosen because of his outstanding reputation in the field of chemical engineering.

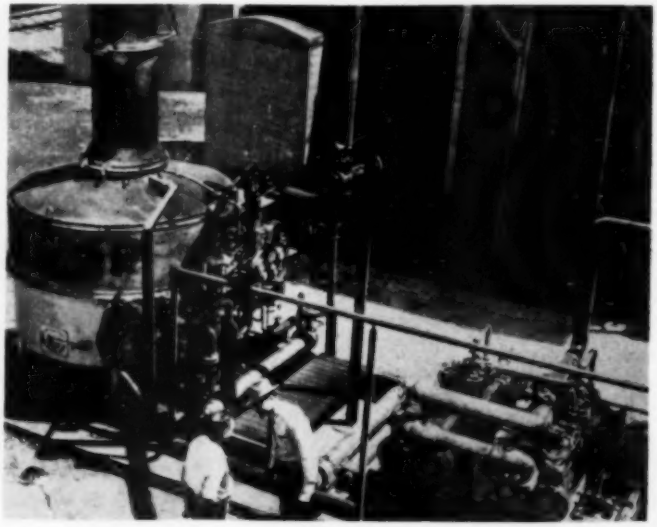
During Dr. Mason's absence, Dr. Paul W. Weber, Director of the School of Chemical Engineering, will serve as Acting Dean of Engineering, and Dr. Robert J. Raudebaugh will

STEAM FOR RENT—Production Maintained in Texas Plant When Boilers Came Off The Line

THREE BOILERS at the General Tire and Rubber plant in Baytown, Texas, had to come off the line for repairs. The plant engineers needed enough processing steam to keep up production. Mr. Green, Maintenance Foreman at General Tire, worked out an arrangement to rent a Vapor-Clarkson steam generator from the Texsteam Corporation, Houston, Texas.

The arrangement was put into action in two days. A concrete base was poured and the next day the complete packaged Vapor-Clarkson steam generator was shipped on one truck. Unit was unloaded, installed, piped up and on the line in a few hours. The gas fired unit produces 22,000 lb/hr at 165 lb pressure 24 hours per day.

No men were added to take care of this unit as automatic controls take over after it is started. However, three firemen, one for each shift, would have been required if they had used three regular 9,000 lb/hr oil field boilers,



At the left is the Vapor-Clarkson 22,000 lb/hr steam generator rented by the General Tire & Rubber Company, Baytown, Texas, for four months during overhaul of the plant's three regular boilers. Natural gas is the fuel. Two boiler feedwater pumps are visible in the right foreground, one being used as a standby. Steam generator and pumps were rented from the Texsteam Corporation of Houston, Texas, and shipped to location on one truck.

take over as Acting Director of the School of Chemical Engineering.

The Engineering Educators program was recently inaugurated for the purpose of improving college-industry understanding. It proposes to help engineering education by giving the visiting educator a broad knowledge of all phases of the operation of a large engineering industry. The visiting educator will in turn contribute to industry by his knowledge and experience. Among other things, he will have an opportunity to learn about the problems of the newly employed graduate from the graduate himself, learn the details of any engineering job of particular interest to him from the man on the job, and discuss organization and management problems with top level management. All of this knowledge and experience he will later share with students and colleagues upon his return to his educational activities.

Cleco Appoints Distributors

The Cleco Division of the REED ROLLER BIT COMPANY, Houston, Texas, has announced the appointment of OLIVER H. VAN HORN COMPANY, 1742 St. Charles Avenue, NEW ORLEANS 1, LOUISIANA; and PEERLESS SUPPLY COMPANY, INC., SHREVEPORT, LOUISIANA, as distributors for Cleco products in their areas.

Cleco manufactures the Cleco and Dallett lines of air tools and accessories—including tools for construction, manufacturing, metal fabrication, foundries, industrial maintenance and stone carving.

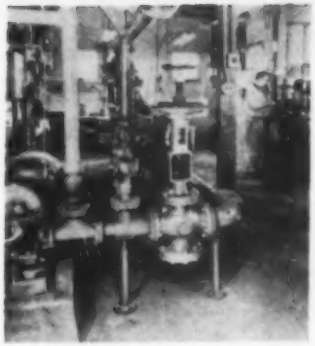
American Floor Surfacing Names Ritz—Winston-Salem

The appointment of JACK R. RITZ as distributor in the WINSTON-SALEM territory has been announced by the AMERICAN FLOOR SURFACING MACHINE CO., Toledo, Ohio.

Mr. Ritz has been working out of the Toledo office and plant for the past two years. During that period he has completed the American sales training program.

Leslie Co. Expands Engineering Facilities

A new wing providing increased engineering space has been added to the plant of LESLIE CO., Lyndhurst, New Jersey, manufacturers of pressure and temperature regulators and controllers, to cope with the fast growing needs of this vital industry.



Partial view of the new Leslie Co. test laboratory.

This new and larger Engineering Department includes a larger modern drafting room and new test laboratory, which provides added facilities for long range research and development to add new and improved equipment to the Leslie line of high quality products.

A-C Distributors

Newly named Southern distributors for various products of ALLIS-CHALMERS MANUFACTURING COMPANY'S general machinery division are the E. C. BLACKSTONE Co., 600 Madison Ave., MEMPHIS, TENN., and the EUGENE W. ZIMMERMAN Co., 509 North Fayette St., ALEXANDRIA, VA.

The E. C. Blackstone Co. has been appointed a distributor for Allis-Chalmers motors, controls, pumps, transformers and "Texrope" drive equipment in portions of Tennessee, Mississippi, Kentucky, Missouri, and Arkansas.

The Blackstone company was established in 1946. It is headed by E. C Blackstone and has C. L. Schultz and J. F. Williamson as vice president and secretary, respectively.

The Eugene W. Zimmerman Co. has been named a distributor for Allis-Chalmers motors and controls in Arlington and Fairfax counties in Virginia. Eugene W. Zimmerman is owner of the concern, which was founded in 1947.

M-H Sales Managers Atlanta and Dallas

Regional industrial sales managers recently named by the Industrial Division, Minneapolis-Honeywell Regulator Company include Jack E. Macconville, the Southeast with headquarters in ATLANTA, GEORGIA; and Robert L. Mallory, the Southwest, with headquarters in DALLAS, TEXAS.

Yale & Towne—Tennessee

The contract to build the new Yale lock and builders' hardware plant at GALLATIN, TENN., has been awarded by THE YALE & TOWNE MANUFACTURING COMPANY to R. C. Mathews, Contractor, Inc., of Nashville, Tenn., with construction supervised by Marr and Holman, Nashville firm of architects and engineers.

The new plant is scheduled to be completed before the end of the year. It will be a cone-story building with a floor area of approximately 75,000 sq ft.

Coney Island Roller Coaster in W. Virginia?

No roller coaster, but a rubber conveyor belt system transporting coal from a mining area to a large steam generating plant now under construction on the banks of the Kanawha at Glasgow, West Virginia. Steel towers supporting the conveyor system, featuring a *B. F. Goodrich* rubber beltroad, are as high as 30 ft at some points. Excavation to level the belt route was not attempted because of constant threat of landslides. Dips and rises vary from 11 degree declines to 17 degree inclines.

First flight of rubber belt, a 1200 ft section, picks up coal from a drift mine 500 ft up on the side of a 1900 ft mountain and carries it down the mountainside at a 17 degree angle for an overall drop of 296 ft. Belt threads its way across country for more than 4000 ft, then rises to cling to the steep side of a second mountain which it circles for 4700 ft in a series of roller coaster dips and rises. It then burrows into a 4000 ft tunnel drilled through the base of a third mountain. Belt emerges finally at the river, near Montgomery, West Virginia, 14,000 ft from the start of its ride.

Entire system is composed of nine flights, or sections, of rubber conveyor belting, ranging in length from 230 ft to 3,770 ft, pulley to pulley distance. Downslope belt is 42 in. wide, cord-reinforced, and can handle 350 tons an hour. Eight remaining belts are 36 in. wide, and can handle 550 tons an hour. Nine conveyor drive motors are capable of producing a total of 550 hp but the system requires only 363 hp electrical input to move the coal from mine to river. Three of the conveyor belts actually generate power. They are the declining belt driver and power generated at these points is fed back into the line.

helping the man-in-the-plant

(these practical discussion items start on page 96)

Getting More Service From INDUSTRIAL HOSE

By J. A. MULLER, Executive Engineer, Thermoid Company

THE first step in getting the most from your industrial hose is to select the correct hose for the job. Many users give very little thought to selecting hose, buying mainly on price. There are many special types of hose for special applications in many industries.

The standard rubber hose consists of an inner tube, a carcass of fabric or cord and a cover. The composition of the rubber of the inner tube determines what material can be carried. The kind and the thickness (number of plies) of the carcass limits the pressures the hose can stand. The cover is designed to withstand the various working conditions encountered in industry.

Tube

Significant advances in rubber chemistry have greatly enlarged the usefulness of hose. Rubber in the tubes can now be compounded to resist attack by oil, butane, propane, acetylene, insecticides, paints, lacquers, mild acids and a host of other chemicals. Hoses are in use for carrying dry and wet solids as well as gases and liquids. Abrasion resistance is built into the tubes of such material handling hose.

Hose for carrying steam, hot water or other hot liquids also have heat-resistance incorporated in the rubber of the tube.

The simplest rubber hose consists of rubber only and is generally used to carry water or air at low pressures. In the simple hose, the tube, carcass and cover are all one. When a hose must carry gases or liquids under pressure, a simple tube is not enough. So reinforcement of cotton, rayon, nylon, steel, is wound or braided around the tube. The higher the pressure, the more reinforcement is required. In cases of extremely high temperatures of the material being carried or of the working environment, asbestos may be incorporated in the carcass.

The carcass also enables the hose to withstand excessive deformation under service conditions.

Cover

The carcass must be protected from moisture, abrasion, oil, impacts and sunlight by a cover. The cover also helps identify the hose and makes for better appearance. What is true of rubber compounds available for tubes is also true for covers. Many more compounding ingredients are available today than a few years ago. Better resistance to wear, petroleum products, sunlight and cuts can now be built into the cover. In some cases wire reinforcement is interwoven in the carcass to prevent collapse of the hose instead of for burst-resistance. This type of hose is used mainly in unloading liquids such as fuel oil from trucks. The hose is carried on a reel from which the hose is unwound to reach the tank. The hose is almost never completely unwound. The pressure of many layers of hose on the reel would flatten the hose, making passage of liquids difficult or impossible unless the hose were reinforced to hold its round shape under all conditions.

Although not a component of hose, couplings are an important

For long, efficient, economical life . . .

Will the hose chosen withstand attack from the **material carried?** If a petroleum product is to be carried, an oil resistant hose should be specified. Paint and some insecticide sprays take a special hose. Steam requires a special hose.

Working Pressure. Stay within manufacturer's limits. Some hose will handle extra pressure for a while but it will fail more quickly and more than likely, unexpectedly with damage to personnel and equipment and loss of production.

The **temperature** of both the material being carried and ambient temperatures should be considered. Low and high temperatures must be compensated for by special rubber compounds and constructions.

The inside diameter of a hose determines the **carrying capacity.** If the diameter is too small, you won't get the column required. Too large a diameter means lower pressures.

Specify enough **length** to avoid stretching. Excessive length increases the chance of kinking.

The hose system is only as good as its **couplings.** Even the best hose can't operate with incorrect, improperly applied couplings.

Abrasion resistant covers are a must for **severe service conditions** such as mines, quarries, heavy industrial manufacturing.

part of any hose system. Many types are available for general and specific uses, made from several kinds of metals. In high-pressure applications, the couplings become the most critical factor. It is easy enough to design a hose to take pressures as high as 5000 psi by using enough steel wire reinforcement and enough rubber. The problem is to bond the hose to the coupling. Thermoid has solved this particular coupling problem by a patented design in which the steel wire reinforcement is attached positively and mechanically to the coupling. This coupling finds its greatest use in the oil fields in rotary pressure seal hose.

Construction

Rubber hose is manufactured by two processes: long length (lead press or molded) and mandrel built. The tubes for both types are made by the same extrusion process. In long length hose, the carcass consists of yarn or cord braided continuously over the tube, the cover is molded on the carcass. The carcass of a wrapped hose is usually fabric of synthetic or cotton yarn wound around the tube, or synthetic or cotton yarn braided around the tube. The cover is then vulcanized to the carcass.

Hose for high pressure and steam service in which either steel wire or high tensile yarn is required for adequate reinforcement is mandrel built. The wire or yarn may be braided or wrapped by machine. Intermediate plies of fabric or asbestos may be used.

Maintenance

Maintenance begins as soon as the roll or length of hose is received from the railroad or truck line. If the hose is not being used immediately, store inside out of direct sunlight in the manufacturer's original wrappings. Do not unwrap and leave the roll outside in direct sunlight. If the roll must be left outside, put it out of harm's way.

When the hose is to be used, unwrap and uncrate carefully. Don't slash at the bindings with a knife, you may cut gashes in the new hose. If delivered uncoupled, make sure the correct type and

Instead of buying on a price basis, select the correct hose for the job. Consider material carried, working pressure, temperature, carrying capacity, and correct coupling application.

size of couplings are used. Check the length required before cutting. Use a sharp cutting tool and cut the hose square. Make sure the coupling is properly placed on hose, that it is inserted all the way in, that the securing clamps or other devices are tightened. If the volume of coupling is large, a hose shop should be set up with proper tools and suitable personnel trained. If your organization uses thousands of feet of hose regularly, the value of a hose installation and maintenance crew should be investigated. The function of this crew would be to inspect hose regularly for weak spots, cuts and worn spots, loose couplings so that actual breaks would be avoided.

Keep the hose away from hot pipes, stoves and hot pieces of equipment. If contact with hot metal cannot be avoided, cover the hot spot with asbestos.

Although anti-oxidants are put into all modern hose covers, oxidation remains the principal enemy of rubber hose. Strong, direct sunlight speeds up oxidation and should be avoided. A particularly bad offender is ozone (O_3) which occurs to some extent at high altitudes and in harmful concentrations near high-voltage equipment.

Oil and grease on a hose are bad unless the hose is specifically designed as oil-resistant.

Harsh abrasion and punctures should, of course, be avoided. It is generally good practice to cut out a badly worn spot before an actual failure occurs and install a new coupling.

Take care to keep hose away from falling rocks. In quarries, mines, construction jobs where falling material is a normal occurrence, hose should be removed to a safe area before blasting or should be protected by a guard. At road crossings hose should be carried overhead on a scaffolding or underground by conduits.

When not in use, hose should be stored inside out of the sun, flat on the floor rolled in coils of large diameter to avoid kinking. The rolls should not be so large that the weight of the coils will crush and weaken the bottom layers of hose.

For temporary storage hose can be hung on wall brackets. Adequate support in more than one place is required to prevent sharp bends. Hooks or other supports should be thick enough so that the hose is not cut or subjected to excessive distortion at the point of contact.

BIG TURNOVER? . . . What's Wrong?

Keeping plant personnel contented, yet efficient; enthusiastic about their job, even if not at top salary; capable of using sound judgment and improving their knowledge even if not too well educated, are problems often encountered.

FREQUENTLY, a chief engineer may not realize that in the handling of men he has assumed these responsibilities and if he does not realize it, chances are that he is not very successful at it. He might ask himself why a man will work at a job for awhile, unhappily, then change to a job in a similar field at less money and be happy. Invariably, the answer is working conditions. Even though the chief has but one or two men, he is faced with these problems.

The chief with a big turnover had better ask himself what's wrong and what he can do about it.

Underpaid operators are not top quality. If they were, they wouldn't stay long, or probably would never start. The answer is obvious. The chief must sell his management on the fact that industrial plant equipment costing thousands is being entrusted to men who may ruin it in less than a minute, and to get capable men they must be paid at least a comfortable wage.

Suppose these wages are on a comparative level to competitive positions. Then, are the men given good working conditions, fair treatment, opportunity to study and advance when promotions come due? Try the following check list and see how things stand.

1. Do you always reprimand your men in private?
2. Do you encourage your men to study and improve their knowledge?
3. When promotions come due, have men in the organization been encouraged to prepare for them?
4. Are conveniences provided and kept clean—sanitary facilities, showers, locker rooms?
5. Are you fair in the keeping of "time" clock hours?
6. Do you graciously permit requests for reasonable, infrequent time off for personal reasons?
7. Do you avoid all favoritism to one or more employees?
8. Do you always take time to listen to complaints and do what you can with management to satisfy the man if the complaint is legitimate?
9. Do you circulate catalogs, instruction bulletins and educational literature, feeling it is their business to learn more about how the equipment functions?
10. Do you avoid behind-the-back discussions and have them face-to-face?

If your answer is "No" to these ten questions, you might as well know that you are heartily disliked, the men are unhappy, and that they won't be with you long.—*Harry M. Spring.*

. . . coming in October

5th Annual
BETTER PRODUCTION ISSUE Featuring
Case Studies from Southern and Southwestern Plants

The 1952 **BETTER PRODUCTION ISSUE** of S. P. I. will present specific instances showing how Southern and Southwestern Plants are getting better performance and production because of improvements they have made in:

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Piping & Vale Systems
Electrical Systems & Controls
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Other Functions of Broad Interest

CASE STUDIES will show exactly how production has been improved in specific Southern and Southwestern plants. While emphasis will be placed on increased production, related improvements such as equipment modernization, better maintenance, fewer rejects, reduced operating costs, etc., will be included as part of the overall **BETTER PRODUCTION THEME.**

WHAT'S NEW and Where to Get It

for on-the-job operation-maintenance

Free literature on the latest developments in equipment and supplies is offered by leading manufacturers. For your copy, circle the item number on one of the reader service post cards provided on pages 17 and 18.

B-10 **V-BELT DRIVES**—Catalog Section 50A, 32 pages—Simple formulas for standard quarter-turn and V-flat drives are augmented by tables of drives in all belt sections, which have been compiled for quick selection of drives of required ratio and speed. Includes engineering information on other types of V-belt drives. — FORT WORTH STEEL & MACHINERY COMPANY, P. O. Box 1038, Fort Worth, Texas.

B-11 **WATER TREATMENT**—Bulletin, 6 pages—Describes the Sola process for treating industrial and potable water. Device, functioning on a catalytic process, is claimed to eliminate scale formation and corrosion in boilers, heat exchangers, and other process equipment. Discusses process, installation, operation, applications, and servicing. Ten installations most usually employed in industry are shown with assembly diagrams.—SOLA CATALYTIC COMPANY, 320 Browder St., Dallas, Texas.

B-12 **PARTS CLEANING EQUIPMENT** —Bulletin, 4 pages—Describes Turbo-Blast parts cleaning unit having 13 in. impeller, rotating at 420 rpm to create a fast-cleaning action of the detergent-charged solution, thereby removing dirt, oil, sludge and grease with minimum of labor, as operator is relieved for other work while machine is in operation. Suggests applications for maintenance departments of all types of industrial operations, including four standard models for gas or fuel oil.—STORM-VULCAN, INCORPORATED, 2225 Burbank St., Dallas 19, Texas.

B-13 **STEAM TRAPS** — Catalog *3*, 44 pages — Manual of recommended trapping practice includes a trap catalog section containing complete physical data and list prices on the company's cast semi-steel and forged steel inverted bucket steam traps, compound steam traps, and ball float air and air relief traps.—ARMSTRONG MACHINE WORKS, Three Rivers, Mich.

B-14 **PLASTIC TAPE**—Folder No. 8—Illustrates and describes Labelon plastic tape for labeling, and shows how it may be applied to any smooth surface, written on with pencil, stylus or dry ball point pen. Gives data on color, widths, and other features. Sample included. — LABELON TAPE CO., INC., 450 Atlantic Ave., Rochester 9, N. Y.

B-15 **CRANE EQUIPMENT** — Bulletin CS-1, 32 pages — Presents complete line of electrical equipment designed for overhead crane service, including items from crane control to current collectors. Illustrated with photographs, charts, and drawings. Background information included.—HARNISCHFEGER CORP., Overhead Crane Division, Milwaukee 46, Wis.

B-16 **RADIANT PANELS**—Bulletin CS-605, 6 pages—Describes Chromalox electric radiant panels, and explains how this new infrared generator can be used for paint baking, curing, drying, degreasing and other operations. Gives data on built-in features, dimensions, ratings, and intensity controls. Illustrated.—EDWIN L. WIEGAND COMPANY, 7563 Thomas Blvd., Pittsburgh 8, Pa.

B-17 **CYLINDER POWER** — Technical Bulletin, 6 pages—Illustrates 16 cylinder powered movements and shows 21 actual application photographs. Describes how cylinder power can be utilized to speed production on all types of machines and equipment. Includes hydraulic and pneumatic cylinders, manually and electrically operated control valves. HANNA ENGINEERING WORKS, 1765 Elston Ave., Chicago 22, Ill.

B-18 **MATERIALS HANDLING**—Booklet 2008-H, 12 pages — "Cleveland Tramrail Engineering and Application Data" explains construction and application of tramrail overhead materials handling equipment. Discusses track design, track stresses, and solution to track peening. Covers flexible method of track support, carrier designs, motor head construction, track switches, cranes, automatic interlocks, and types of electrification.—THE CLEVELAND CRANE & ENGINEERING CO., 1036 East 283th St., Wickliffe, Ohio.

B-19 **STEEL SHELVING** — Catalog, 8 pages — Illustrates and describes line of Iron-Grip shelving re-enforced to hold loads up to one ton on each shelf. Includes photographs of models available, with dimensions and prices of each. Design and construction features are explained.—EQUIPTO, DIVISION OF AURORA EQUIPMENT CO., Aurora, Ill.

B-20 **PUBLIC UTILITY STORAGE**—Brochure, 8 pages—"A Study in Progress" is the case history of how one major public utility meets the problem of reducing cost and increasing worker productivity in handling, storing, and warehousing the huge volume of supplies and equipment essential to day-by-day opera-

tion.—HYSTER COMPANY, 2902 N. E. Clackamas St., Portland 8, Oregon.

B-21 **CORROSION PREVENTION**—Bulletin, 4 pages—Describes "Rickwilite" line of phenolic resin coatings formulated to protect equipment against extremely corrosive conditions in all types of industry with a tough film which is resistant to attack by corrosive acids and alkalis, salt water, rust, and weathering.—RIC-WIL PLASTIC COATING & MFG. CORP., 1290 Euclid Ave., Cleveland 15, Ohio.

B-22 **INDUSTRIAL INSTRUMENTS** — Catalog 90-2, 41 pages — "Supervisory Instruments for Power Generation" is devoted to instrumentation involved in power generating stations, including discussion of measurement of temperature, pressure, flow, power generation and other variables encountered.—MINNEAPOLIS-HONEYWELL REGULATOR CO., Brown Instrument Div., Wayne & Windrim Aves., Philadelphia 44, Pa.

B-23 **MOTOR CONTROL CENTERS**—Bulletin No. 460—Provides information for electrical equipment specifiers and plant operating men on modern concentrated motor control equipment known as "Concentrol." Explains and illustrates design and application.— CONTINENTAL ELECTRIC EQUIPMENT CO., Box 1955, Cincinnati 1, Ohio.

B-24 **EXPANSION JOINTS** — Bulletin CMH-119R, 8 pages—Illustrates and describes Flexon line of expansion joints, giving complete specifications and installational data for low pressure applications, high pressure installations, and for the handling of extremely high pressures.—FLEXONICS CORPORATION, Maywood, Ill.

B-25 **FLOW RATE CONTROL**—Bulletin 521, 4 pages—Describes line of flow rate regulators and explains principle of operation. Lists applications for blending-proportioning; solvent extraction; filter effluent; water treatment and deionizing; chemical process control, and other uses. Illustrated with line diagrams and equipment photographs.—W. A. KATES CO., 430 Waukegan Road, Deerfield, Ill.

Free Reader Service

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For your copy, circle the item number on one of the reader service post cards provided on pages 17 and 18.

Instrumentation

(*Starts on page* 86)

est control possible. Maintenance of close control of furnace temperatures constitutes further assurance against loss of metal.

Exemplary of the need for close control of furnace temperature are experiences in the heat treating of rods. Formerly, on-off temperature control was employed for the electrically-fired furnace used for this purpose. However, the cyclic control inherent in this type of regulation resulted in many loads of rod being burned up and, consequently, lost. It was essential that some means of proportioning the heat input to the furnace be provided so as to obtain the requisite close control demanded.

To provide the necessary close control of furnace temperature, both on the structural mill roller hearth heat treating furnace and others where equally precise control was essential, instruments with electronic, time-proportioning relays, automatic reset and rate action were selected. These Electr-O-Pulse relays are especially adaptable for industrial heating processes that require proportioning control and where it is necessary that heat input be full on during heating periods.

Specifications All-Important

As already noted, the importance of maintaining critical processing temperatures is twofold. Insurance that materials will meet Army-Navy specifications is extremely important, for the large portion of the plant output goes to the aircraft industry where rigid specifications must be met. Assurance of proper grain structures is important because many of Reynolds' customers perform various forming operations on the semi-finished products produced at Sheffield.

Regardless of final disposition, temperature measuring and controlling methods, as well as processing techniques, are geared to one goal—that of efficiently producing aluminum semi-finished products with uniformly maintained, rigid metallurgical characteristics and exceptional quality.

Power Factor

(*Starts on page* 90)

In other words, the 26.8 ckva pulls that much off the 52.2 rkva leaving 25.4 rkva that will obtain at a power factor of 92 per cent.

In the application of capacitors to this particular problem we would choose 2-15 kva units, or a total installed capacity of 30 kva.

Where would we put these capacitors, you would ask. There is no one good, hard fast rule to cover this part of our problem. Generally, or rather technically, the best place to put the capacitors would be at the terminals of the motors. But it may not be always convenient or even possible to do this. Sometimes it's best to use one or two large units on the feeders; other times it's best to use several small units scattered throughout the plant. A little study and thought devoted to the problem will lead to a good solution.

That about winds up our discussion on power factor. We could go into great detail about motors, motor operation curves, power factor—load curves; and present a detailed discussion about power factor correction by the use of synchronous motors. But all I have tried to do here is give my friends in the plant some basic instruction as to the WHAT, WHY and HOW of that electrical phenomenon we all know as "Power Factor."

Needless to say, the reader cannot be expected to remember all we have said on power factor. He will need to keep these articles and refer to them frequently as he advances in plant knowledge. Before too long power factor will become as plain as volts and amperes, and the reader will have mastered one more obstacle in his path of progress.

In November—learn about instruments and meters.

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1 Kewanee HM9 Scotch—very good condition.

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JENKINS PRACTICAL PIPING LAYOUTS 62

SCHEDULE OF VALVE POSITIONS FOR COMPLETE CYCLE OF OPERATION

Operation	A	B	C	D	E	F	G	H
Softening	Open	Open	Close	Close	Close	Close	Close	Open
Backwashing	Open	Close	Open	Open	Close	Close	Close	Close
Brining	Open	Close	Close	Close	Open	Open	Open	Close
Rinsing	Open	Open	Close	Close	Close	Close	Open	Close

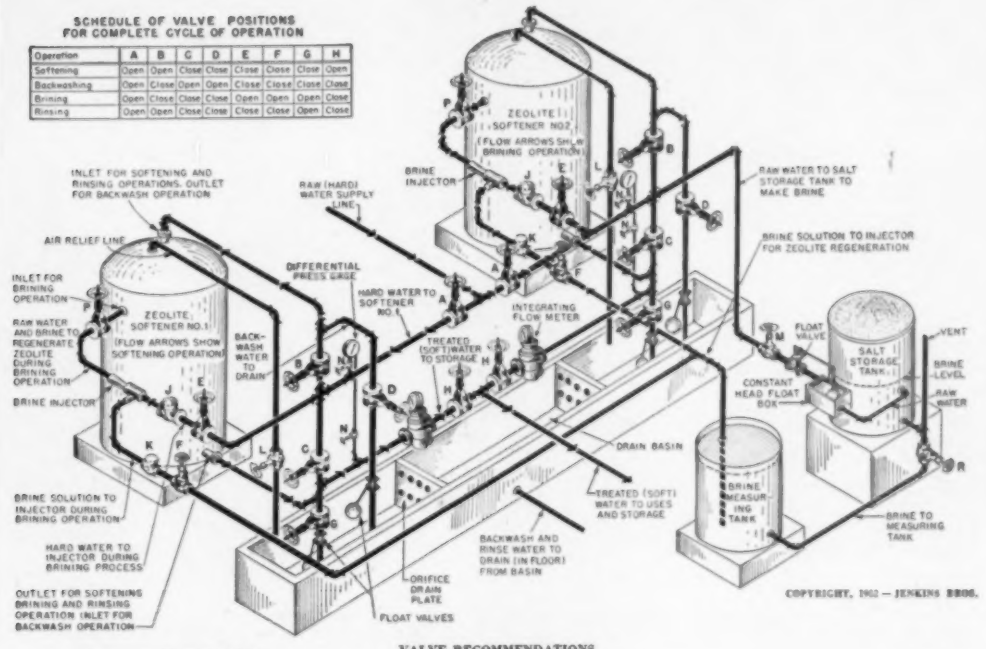

Diagram by Huxley Madeheim
Consulting Engineer

VALVE RECOMMENDATIONS
For details of valves to suit varying conditions, see Jenkins Catalog

Code	Quan.	JENKINS VALVES	SERVICE
A	2	Fig. 651 I.B.B.M. Gate or Fig. 100 All Iron Gate	Raw Water Supply to Softener
B	2	Fig. 651 I.B.B.M. Gate or Fig. 100 All Iron Gate	Control of Cycle Operations
C	2	Fig. 651 I.B.B.M. Gate or Fig. 100 All Iron Gate	Control of Cycle Operations
D	2	Fig. 651 I.B.B.M. Gate or Fig. 100 All Iron Gate	Backwash Drain Line
E	2	Fig. 100 All Iron Gate	Injector Water Shutoff
F	2	Fig. 40-A All Iron Gate	Brine Control to Injector
G	2	Fig. 651 I.B.B.M. Gate	Brine and Rinsing Operation Drain
H	2	Fig. 651 I.B.B.M. Gate	Softened Water Shutoff
J	2	Fig. 624 I.B. Swing Check or Fig. 85 All Iron Swing Gate	Prevent Backflow
K	2	Fig. 623 I.B. Swing Check or Fig. 83 All Iron Swing Gate	Prevent Backflow
L	2	Fig. 106-A Bronze Globe	Air Release
M	1	Fig. 106-A Bronze Globe	Water Supply for Brine
N	4	Fig. 743-G Bronze Needle	Pressure Gage Control
P	2	Fig. 100 All Iron Gate	Brine Connection Shutoff at Softener
R	1	Fig. 40-A All Iron Gate	Brine to Measuring Tank

How to plan a ZEOLITE (BASE EXCHANGE) WATER SOFTENING SYSTEM

Diagram shows piping connections for a zeolite water softening system (removal of hard water impurities). Twin softening units permit one to operate while the other is being regenerated, (replacing used sodium in the zeolite).

The complete cycle consists of softening, backwashing, brining, and rinsing. After a certain amount of raw water has been softened, the sodium in the zeolite is used up. The process is then stopped by operating the valves as indicated in the schedule, and the other softening unit is put into operation.

The zeolite is regenerated, after the backwash operation (first step in regeneration of softener), by replacing accumulated calcium and magnesium with the sodium by running through a brine solution. The zeolite is then rinsed after correct amount of brine solution has been admitted.

The rinsing operation also removes any remaining brine, making the softener ready for re-use when needed. Depending upon the chemical composition of the water, either iron-body bronze-mounted or all-iron valves are recommended on all lines conducting the water before it is completely treated.

Consultation with piping engineers is recommended when planning any major piping installations.

To save time, to simplify planning, to get all the advantages of Jenkins specialized valve engineering, select all the valves you need from Jenkins complete line. It's your best assurance of *lowest cost in the long run.* Jenkins Bros., 100 Park Ave., New York 17.

Complete description and enlarged diagram of this layout free on request. Includes additional detailed information. Simply ask for Piping Layout No. 62.

DOWELL SERVICE

CHEMISTRY APPLIED TO MAINTENANCE CLEANING PROBLEMS

A Utility asked:

"Can you help us get our boiler cleaner?"

The boiler tube section on the left was cut from a tube after the boiler was turbined. The section on the right is from the same tube after the boiler was further cleaned by Dowell Service.

Dowell Service removed 1,650 lbs. of deposits left after turbining

Dowell was recently called upon to clean a 150,000 pphr. boiler. In a few hours, 1,650 lbs. of deposits were removed even though the boiler had been previously cleaned by turbining!

If you have a cleaning job to be done on boilers or heat exchange equipment, look to Dowell Service. Special liquid solvents are applied according to the technique demanded by the job—filling, spraying, jetting, cascading or vaporizing. No scaffolding or dismantling is necessary—costly downtime is held to a minimum.

Dowell Service is used to clean many different types of equipment—condensers, process towers, pipe lines, storage tanks, boilers, heat exchangers, evaporators, tanks and water wells. Dowell furnishes all necessary trained personnel, chemicals, pump trucks and controls.

Dowell engineers have experience in all kinds of cleaning problems. And Dowell equipment is designed to help them do the best possible job. Call the office or station nearest you for complete information and estimates. No obligation, of course.

Other recent Dowell jobs:

6 black liquor evaporators in a paper mill were cleaned by Dowell Service. The result was a 25% more efficient use of steam.

•

2 fuel oil heaters were cleaned by Dowell Service for a sugar company. Pressure drop was reduced from 60 p.s.i. to 30 p.s.i. and temperature was increased by 40° F.

•

3 heat exchangers in a refinery were cleaned by Dowell Service. After cleaning, one unit could carry the load previously carried by all three.

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★ *Maintenance cleaning service for industrial heat exchange equipment.*

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